The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Overseas Chemical Trade

THE returns of overseas chemical trade for the past year, just issued by the Board of Trade, represent a considerable improvement on the figures for the previous year. The exports of chemicals, drugs, dyes and colours amount to £25,414,223, against a corresponding total of imports of £15,367,796. Put in another way, the chemical exports during 1928 exceeded those of 1927 by £2,011,500, and those of 1926 by £3,754,507, while the chemical imports during 1928 were £134,626 less than in 1927 and £80,902 less than in 1926. Chemical re-exports (exports of imported merchandise) during the year amounted to £1,021,011; this, again, represents an increase over 1927 of £8,610 and over 1926 of £36,877. These figures are much too consistent to be read in any but one way. They indicate a steady and progressive recovery in British chemical industry, a restoration of trading confidence and good possibilities of future expansion.

The increase in export trade is spread fairly well over the whole range of chemical products. The export of glycerine, both crude and distilled, is slightly lower, and here and there—in potassium and sodium compounds, for example—a small decline may be detected, but in the main the figures are consistently upward. There are substantial increases in sulphuric and tartaric acids; the sulphate of ammonia figures have advanced from £1,939,831 in 1926 and £2,713,719 in 1927 to £3,858,846 in 1928; coal tar products are better by £354,740; there is a notable improvement in dyestuff exports from £752,748 to £905,781; painters' colours, etc., a strong feature even in poor times, show a further improvement. On the imports side there is a striking drop in coal tar products from £1,045,771 to £369,714; dyestuff intermediates, £8,067, are almost exactly what they were in 1927, though nearly double the 1926 figure; alizarine, while the same within a fraction as in 1927, is just half what it was in 1926; synthetic indigo does not appear in the figures, but natural indigo has advanced from £6,524 to £8,435.

The Registration Problem

THE Institute of Chemistry, in reviewing the registration problem in the last issue of its journal, makes one pertinent and accurate observation at the outset, namely, that up to the present time any enthusiasm for or against the proposal to constitute a Register of Chemists has been limited to comparatively few, and the majority of members of the Institute at least have shown little or no interest in it. At the same time the Institute recognises that the report of the Inter-Departmental Committee on the Poisons and Pharmacy Acts may be published in the near future, and may contain some reference to the use of the title "chemist," which was the subject of a recent memorandum by the Institute. In view of these possibilities and of discussions initiated elsewhere, it has been thought desirable to explore the whole subject, and the Institute, as usual, does the work thoroughly.

The historical introduction is certainly helpful, since it shows the effects produced by a register on medical men, lawyers, veterinary surgeons, dentists, accountants, patent agents, surveyors, etc. In certain cases the practical effect is to constitute a closed profession, though the degree of restriction varies. In medicine and law, only those duly admitted are recognised as qualified to practise either profession, though the quack doctor and the amateur lawyer who drafts wills may still survive. In the less severely restricted professions, registration merely gives the man on the register a professional hall mark that the unregistered does not possess, though in practice, for example, an unchartered may still be the equal of a chartered accountant. In addition, there is the important point, in the case of doctors and dispensers and sellers of poisons, that properly registered qualifications are necessary for the protection of the public,

quite apart from any benefits that may accrue to the registered or chartered person himself.

In the case of chemists, there is a fairly general feeling that some recognised professional status would be an advantage. At the outset, two practical points present themselves. The first is that the legal title to the use of the term "chemist" really belongs to the pharmacist, who is registered for the sale of poisons. The second is that the Institute of Chemistry has already established a register of professionally qualified chemists—associates who possess a satisfactory qualification in general chemistry and fellows who possess further experience and ability to carry out independent work. There can be no doubt that the Institute's qualifications carry great weight; at the same time its register is not compulsory, and numbers of fully qualified chemists for some reason or other are not on it. Are those outside to be compelled to come in? If so, obviously the first step is to frame a generally acceptable definition of the term "chemist," and that is one of the difficult tasks yet to be accomplished. On the whole, the Institute's review of the subject leaves one in a not very enthusiastic frame of mind.

The Late Sir John Brunner

THE death of Sir John Brunner (an obituary notice of whom appears elsewhere in these columns) will arouse widespread feelings of sorrow in the chemical industry. All his life he was active, not only in the industry, but in the wider sphere of public life; and, as the son of one of the founders of the firm of Brunner, Mond and Co., he was a link with the past the breaking of which will cause a pang even to those to whom he was known only by name. The history of Brunner Mond's is one of the great romances of industry, and its growth and development contributed greatly to national progress. Its absorption into Imperial Chemical Industries marked a step forward into yet wider fields, opening up possibilities undreamt of by the original founders. The passing of one so closely linked with the rise and prosperity of British chemical industry will be felt deeply, not only in this country but overseas.

To Neutralise Derating

FROM the figures so far available, it seems quite possible that any advantages that business is supposed to derive from reliefs under the Derating Bill will be more than neutralised by the ridiculously high re-assessments of industrial property that are being made. The new assessment arrangements have one thoroughly bad feature. The lists are merely posted at local government offices, no notice is served on the ratepayer, and unless the latter makes his own inspection of the lists and ascertains the effect in his own case, he may not realise the additional burdens put upon him until his option to appeal has lapsed. In this matter industrialists would be well advised to take active steps for their own protection, to resist the new assessments where they appear to be unreasonable, and to make known publicly the more flagrant cases. Instances are already coming to light in which industrial property is being re-assessed at more than double its former value, without any apparent reason. It seems a case for vigorous action on the part of industrialists if they are not to be deprived of the benefits it is intended they should receive under the Derating Bill.

Books Received

A CLASS BOOK OF PHYSICAL CHEMISTRY. By T. Martin Lowry and Samuel Sugden. London: Macmillan and Co., Ltd. Pp. 436. 6s. 6d.

ANALYTICAL CHEMISTRY. By F. P. Treadwell. Translated by William T. Hall. New York: John Wiley and Sons, Inc. London: Chapman and Hall. Pp. 848. 30s.

COMMERCIAL, ECONOMIC AND FINANCIAL CONDITIONS IN THE ARGENTINE REPUBLIC. October, 1928. By H. O. Chalkley. London: H.M. Stationery Office. Pp. 108. 3s.

The Calendar

Jan.		
21	Royal Society of Arts. Cantor Lecture: "The Treatment of Coal." Dr. C. H. Lander. 8 p.m.	John Street, Adelphi, London.
21	University of Birmingham Chemical Society: Lecture by Dr. F. A. Freeth.	University, Birmingham.
21	Institute of Chemistry (Leeds Section) and Society of Chemical Industry (Yorkshire Section): "Poisoning and Disease in Industry. II.—Industrial Cancers." Professor R. D. Passey.	Great Northern Station Hotel, Leeds.
21	Chemical Industry Club: The "Signficance of the Infinitely Little in Biochemistry." Professor J. C. Drummond. 8 p.m.	2, Whitehall Court, London
22	Royal Institution: "Critical Phenomena in Saturated Solutions." F. A. Freeth. 5.15 p.m.	21, Albemarle Street, London
22	Society of Chemical Industry (South Wales Section): "The Training of an Ophthalmic Optician." T. Lewis.	Cardiff.
22	Hull Chemical and Engineering Society: "The Refining of Persian Crude Oils." Dr. A. E. Dunstan. 7.45 p.m.	Grey Street, Park Street, Hull.
24	University College, London: Lecture II.—"The Chemistry of Some Natural Drugs." Dr. H. R. Ing. 5 p.m.	Gower Street, London.
24	Institution of the Rubber Industry (Manchester Section): "Storage of Steam." Dr. E. G. Ritchie. 7 p.m.	Hall of the Geographical Society, St. Mary's Parsonage, Manchester.
24	Institute of Chemistry (Belfast Section): "The Recently Discovered Elements." Dr. J. K. Marsh. 7.30 p.m.	Belfast Royal Academical Institution.
25	Society of Chemical Industry (Birmingham and Midland Section): Paper by Professor W. E. S. Turner.	Chamber of Commerce Buildings, New Street, Birmingham.
28	Royal Society of Arts. Cantor Lecture (II.)—"The Treatment of Coal." Dr. C. H. Lander. 8 p.m.	John Street, Adelphi, London.
28	Sir John Cass Technical Institute: Public Introductory Lecture to a course of 12 Lectures on "Coal Carbonisation." F. S. Sinnatt. 7 p.m.	Jewry Street, Aldgate London
28	University of Birmingham Chemical Society: "Sulphur and Rubber." Dr. D. F. Twiss.	University, Birmingham.
29	Institute of Chemistry (Bristol and S.W. Counties Section): "Some Toxicological Cases." Edward Russell. 7.30 p.m.	University, Bristol.
30	Society of Chemical Industry (Newcastle Section): "Tar Distillation." Lecture II. S. A. Wikner.	Armstrong College Newcastle-on-Tyne
31	University College, London: Lecture III.—"The Chemistry of Some Natural Drugs." Dr. H. R. Ing. 5 p.m.	Gower Street, London.

Casein and its Industrial Applications.—(II)

By W. L. Davies, Ph.D., M.Sc., F.I.C.

(Of the National Institute for Research in Dairying)

In the following, Dr. Davies completes the article on casein which was begun last week. He deals with some details of its preparation, and finally with its uses.

Precipitation of the Curd

Hydrochloric acid is used generally for precipitation, and should be diluted to the extent of 1 lb. of acid (20° Bé.) to 8 lb. of pure water. The commercial grade of acid contains iron, which tends to give a yellow colour to the final product. The milk at 90° F. is stirred, and the acid sprayed on until the milk clots, the acid being added at a slower rate at the end. The curd is allowed to settle, and one half of the supernatant liquid drained off. With slow stirring more acid is added, until an apparent *p*H of 4.6 to 4.8 is reached. This is tested by an indicator (methyl red) against an acetate buffer at 4.6 to 4.8_7. (100 c.c. of *N*-acetic acid and 50 c.c. of *N*-NaOH are mixed and made up to 500 c.c. The *p*H of this solution is 4.6 at 18° C., and 4.63 at 25° C. 10 c.c. of the latter plus 5 drops of the indicator solution are mixed in a test tube, which is corked and sealed immediately with paraffin wax.) The whey is drained through cloth, and the curd washed with dilute acid of *p*H 4.6 to 4.8, with slow stirring, just covering the curd with the wash water. The water is drained off and the curd washed twice again. The curd is then transferred to a sloping, grooved table to finish draining, and placed in a press in cloths in such quantities as to give a final cake about 3 in. in depth. The pressed product is then ground in a curd mill, spread on the drying trays in ¼ in. layers, and dried at 120 to 125° C. in tunnel driers by a strong counterblast of warm air.

An inferior grade of product is obtained by the *natural sour method*. Skim milk is allowed to sour of its own accord in vats. When sour, a jet of steam is applied until the contents are nearly boiling. The curd is allowed to settle, and is washed as in acid-precipitation. The product usually has a high fat content, and the high temperature damages the casein, but the ash is low. Souring at 40° C. is more rapid, and there is less growth of putrefactive organisms. The addition of pure cultures of lactic acid bacteria is sometimes resorted to. After removal of the fat, the milk is pasteurised and cooled quickly. The cultures are added and souring allowed to occur as above. High-temperature pasteurisation should be avoided, owing to the fact that casein is very susceptible to heat.

Rennet Precipitation

This method is used extensively in Europe, the product being well adapted for the manufacture of plastics (see below) but not suited for glue-making. The milk is rendered fat-free as above, care being taken that alkali or alkali bicarbonate are not added in excess, as this would delay the rennet action. The rennin used is that in solid form, and not the rennet solutions of commerce. A 5 per cent. solution is made and 10 c.c. per gallon of milk added, the amount of rennin being sufficient to curdle the milk completely in about 30 minutes. Excess must be avoided. The solution is well mixed with milk at 40° C., and the temperature is maintained for 25-30 minutes. The curd, separating in clots, settles to the bottom. The mixture is heated nearly to boiling to destroy the rennin. The whey is drained off, and the curd is washed with *pure* water 4–5 times. The curd is drained, pressed, and dried as for acid-precipitated casein.

Grade and Cost of Production

The grade of product obtained depends (*a*) on the condition of the original milk. For the best product sweet milk must be used; (*b*) The method of preparation has a great influence on the quality of the product. The ash tends to be high with a cooked curd and curd precipitated by sulphuric acid [7]; (*c*) Thorough washing influences the ash-content very much. Washing four or five times is essential for a good product; (*d*) Low moisture content is a good quality in casein, and the method of preparation has an appreciable effect on the hygroscopicity of the product. Cooked-curd casein is more sensitive to changes of humidity of the atmosphere, whereas grain-curd casein (the product from the acid-precipitation mentioned above) responds but slowly.

The cost of production of casein will depend on the cost of skim milk and the quantity produced, but it has been estimated that threepence per pound (not including the price of skim milk) is a generous estimate. Rennet casein is slightly lower in price than acid casein, whereas high prices can be obtained for the best grades, which can be used in food or for medicinal purposes. Buttermilk casein is slightly lower in price than rennet casein.

Buttermilk Casein

The preparation of casein from buttermilk was originally a development to utilise the by-product from butter factories, as well as to satisfy the keen demand for the material. Buttermilk is more variable in composition than skim milk, and treatment of the cream might have had effects on the final casein. The buttermilk is heated to precipitate the curd (125–130° F.) by the steam coil method. The use of a steam jet is not advised owing to damage to the casein. The curd rises to the top, and the clear whey is drained off as much as possible. The curd is washed on cloths with a jet of cold water, which hardens the curd and facilitates subsequent pressing. The pressed material is ground and dried as for acid casein. Solution of the curd in dilute sodium bicarbonate solution (180° F.) and separation of the fat by centrifuging may be resorted to if a purer product is desired. The casein is precipitated from solution as in the acid casein process (or the rennet process may be used if calcium chloride be added to the solution). This gives a good quality curd low in acidity and fat. Exhaustive washing must be carried out to rid the curd of mineral salts.

Quality of Casein

The factors determining the quality of casein are content of pure casein, degree of sub-division, solubility, colour, and condition (sweet or sour). A good casein should be light yellow in colour, not musty or rancid, contain only a trace of acid, and be completely soluble in ammonia and borax. Any insoluble material should be tested for starch or mineral ingredients. Moisture, ash, fat, free acid, nitrogen, and ammonia-insoluble matter should be determined. A specification for a good product would be: Colour, white or cream; almost odourless; moisture not more than 10 per cent.; fat, not more than 1 per cent.; ash, not more than 4 per cent.; nitrogen, 14.25 per cent. or over; acidity, not more than 11 c.c. of 0.1 N-alkali per gram. Additional determinations would be for sugar, calcium, and phosphorus.

Borax Solubility Test

The borax solubility test determines whether the casein is suitable as a coating for paper, and is carried out by mixing 50 grams of casein with 300 c.c. of 2½ per cent. borax solution. With thorough stirring at 65° C., the whole of the casein should be dissolved in ten minutes. A revised method requires [8] the casein to pass a 40-mesh sieve, and 15 grams are mixed with 100 c.c. of a 2.5 per cent. solution of borax. The mixture is thoroughly stirred at five minute intervals for 30 minutes. The character of the casein shows up usually in the first ten minutes.

In this test, a high ash content gives a viscous sol of a slightly lower *p*H than the first quality material (*p*H=9.0.) Caseins from pasteurised milk and cooked-curd caseins have greater initial viscosities [8] than those prepared at lower temperatures, but by the borax test all the viscosities tend to approach one another in 24 hours. The borax test therefore differentiates between high- and low- temperature caseins, the former imbibing water and forming a jelly in the test.

(7) Clark et alii, *Jour. Ind. Eng. Chem.* (1920), **12**, 1163.

(8) Zoller, *Jour. Ind. Eng. Chem.* (1920), **12**, 1171.

Technical Uses of Casein

The use of casein in industry is unique, in that an excellent food is used for industrial purposes. Its colloidal nature, plasticity, and adhesive properties give it an important place—a place which no other substance can fill. Some of the many uses of casein are: (1) In adhesives, such as glues, putties, and cements; (2) In the paper industry for sizing, enamelling, waterproofing, grease- or oil-proofing, sensitising, and for lithographic, drawing, emery paper, and cardboard; (3) In plastics, such as artificial stone, ivory, bone, celluloid, horn, rubber, leather, cork, and jewellery (ebony and jade), and for linoleum, heat and electric insulators, films and plates (transparent), and rods and tubes; (4) In textile industry, for mordants, sizes, loading agents, softening, and waterproofing; (5) In paints, such as calcimines and varnishes; (6) In foods, such as baking powder and proprietary foods; (7) In medicine; (8) For miscellaneous purposes, such as sprays (spreaders), shoe polishes, creams, and pastes. The plastics occur under various trade names on the market, *e.g.*, galalith, lactite, proteolite and xylonite.

Adhesives

It is possible to make from casein glue which will withstand heat and moisture indefinitely without losing its power of adhesion. There is a great demand for casein glue in the plywood trade, and the aircraft industry. A specification of a casein to make glue would be: Must pass through a 50-mesh screen, total acidity 12 c.c. 0.1 *N*-alkali per gram, not more than 1.5 per cent. of fat, not more than 3 per cent. of ash if made by the "natural sour" process, and not more than 4.5 per cent. for grain-curd casein, not more than 8 per cent. of moisture, and not less than 14.25 per cent. nitrogen on a moisture-, fat-, and ash-free basis.

For glue making, concentrated solutions must be used, as dilute solutions have poor adhesive properties. The two main kinds of glues are casein-alkali and casein-lime-silicate glues. The latter are best for resisting high temperature and moisture. Alkali glues are products of the solution of casein in 14 per cent. borax, or 8 per cent. sodium carbonate, or 12 per cent. bicarbonate of soda, or 6 per cent. caustic alkalis. The borax solution is the best glue. A thick dough with water is first made, and the alkaline solution added slowly with vigorous stirring. The lime-silicate glues, which are very resistant, are made by adding lime water and sodium silicate to the wet dough. To obtain a glue of medium viscosity, the water-casein ratio is expressed by the formula $0{\cdot}24\,A + 1{\cdot}85$ [9], where A is the ash content of the casein. The glues are placed on the market either as mixed pastes preserved with sodium salicylate or as powders. In wood and cardboard work casein glues are superior to gelatine glues, and in aircraft work casein glues are almost exclusively used.

Cements are mixtures of casein with lime and alkali silicate, or caustic soda and magnesia. Powdered lime added to casein gives an excellent putty.

The Paper Industry

The paper industry is the greatest user of casein, and the sizing of highly glazed papers calls for huge quantities of the material. Casein size is used as a fixing agent for colours or as binder for enamels. The size consists of thin borax glue mixed with fine kaolin or chalk, the proper proportions of the mixture being determined by the "wax or strength test." This test is carried out by using increasing amounts of casein mixed with a constant quantity of enamel base, preparing strips of enamelled papers from the sizes, and testing adhesion of the clay mixture by observing what can be pulled off the surface of the paper by a stick of sealing wax. The paper fibre is torn away when the right strength of casein is present. Waterproofing of paper and cardboard is done by impregnating the material with casein solution and hardening in formaldehyde solution.

Casein Plastics

Owing to its adhesive properties, a great variety of plastic masses can be made from casein, either alone as a fine powder or in alkaline solution with admixtures of other powders (fillers), such as clay, powdered stone, magnesia, bone dust, etc. Heated to a temperature a little over 100° C., casein becomes very plastic, and can be kneaded, pressed or moulded into any desired shape. With fillers, the plastics dry quickly, can be incorporated with any pigment, or give transparent, horny masses. Oils, gums and waxes can also be incorporated, to give a range of flexibilities, tensile strengths and degrees of hardness.

With a mineral filler, rennet casein is used, but for transparent material, acid casein is preferred. Casein alone is used to make transparent novelties, sheets, plates and imitation horn. It has the disadvantage of giving brittle products which lack tensile strength and flexibility, and fat and ash-free casein is essential. Formaldehyde is used as hardener.

In making artificial stone, casein is used as binding agent for clays, silicas, powdered marble and limestone, and alkaline solutions or heated casein may be utilised. For hardening purposes, substances which form insoluble salts with casein, *e.g.*, alum or tannic acid, or denaturants of casein, *e.g.*, formaldehyde, and trioxy-methylene, may be used. Thirty per cent. formalin is most commonly used as a hardening bath, a good circulation being kept up around the articles in the bath. The time required for hardening depends on the size of the articles, plates of 2 mm. thickness requiring ten days.

Artificial ivory is made from casein tinted with a yellow pigment or with a filler such as bone dust, whiting or ivory dust. Fish scales and calcium phosphate are used for imitation pearl. Artificial celluloid is made by mixing casein with the ordinary ingredients used for making proper celluloid, *e.g.*, cellulose acetate or nitrocellulose. The naphthols and benzoic acid may also be used.

Casein has a very high dielectric constant, and fillers of powdered glass or caoutchouc are used. The use of cork dust, asbestos, jute, paper pulp and other fibres with casein gives a variety of matting materials, imitation leather and linoleum. Imitation jewellery is made by varying the filler, *e.g.*, amber, picric acid for hardening; gold stone, powdered brass or bronze; silver, aluminium powder. The uses to which plastics can be applied are very wide.

Casein Paints

Exposure to air of certain casein compounds renders them insoluble, and the incorporation of pigments in the medium can give pleasant effects. This makes casein the basis of useful paints and varnishes. The paints are very durable, and with formalin hardening are washable. The casein replaces the linseed oil of ordinary paint. Casein provides the sizing property, whereas fillers supply the covering power, For indoor ornamental work, the fillers are kaolin, powdered chalk or lime. For outdoor work, lime or cement is the filler. The paint is prepared by intimately mixing the right proportions of casein, filler and pigment in a paint mill. The powder is mixed with an equal amount of water and thinned down to the necessary consistency for use.

Other Uses

In the textile industry the use of casein is analogous to that in the paper industry. It is used as a loading agent and softener for silk, and a waterproof fabric may be obtained by hardening the casein-impregnated material with formalin. It is also used as a mordant.

Casein enters into the composition of many proprietary foods. The alkali and ammonium salts are also used, as they are more digestible than the casein itself. Incorporation with glycero-phosphates gives a variety of tonic foods. Its use in the manufacture of synthetic milk, bread, chocolate and baking powders deserves special mention.

In medicine, compounds of casein with heavy metals, its halides, its salts with organic acids, and its alkaloidal salts are used. The casein tones down the alkaloidal effect without affecting its specificity.

Its use for "solidifying" mineral oils, as a varnish for paintings and drawings, and as a boot-polish by mixing its borax solution with lampblack, deserve mention. Various toilet creams have casein as their principal ingredient.

Fuller details of the technical applications of this versatile product may be gathered from lists of patents given in text-books on casein [10, 11, 12].

(9) Butterman, *Jour. Ind. Eng. Chem.* (1920), **12**, 141.

(10) Tague *Casein*, Constable and Co., Ltd., London (1926).

(11) R. Scherer, *Casein*, Scott, Greenwood and Son, London (1911).

(12) Sutermeister, *Casein and its Industrial Applications*, Chemical Catalog Co., New York (1927).

British Chemical Overseas Trade

Encouraging Figures for 1928

THE Board of Trade Returns for December give not only the figures of overseas trade for that month, but the complete statistics for the whole year. The latter, in relation to chemicals, drugs, dyes, and colours, must be considered as decidedly encouraging. The imports for the twelve months ended December 31 were of the value of £75,367,796, a decrease of £134,626 on 1927; the value of the exports was £25,414,223, an increase of £2,011,500 on 1927; the re-exports amounted in value to £1,021,011, an increase of £8,610 on 1927. The returns for the month of December alone show a decrease of £202,815 in imports, a decrease of £2,228 in exports, and an increase of £1,164 in re-exports. The detailed figures for the complete year are given below :—

Imports

	Quantities Year ended December 31, 1927.	Quantities Year ended December 31, 1928.	Value Year ended December 31, 1927.	Value Year ended December 31, 1928.
CHEMICAL MANUFACTURES AND PRODUCTS—			£	£
Acid Acetic.....tons	13,118	14,994	574,126	662,328
Acid Tartaric .....cwt.	31,210	36,522	153,553	203,397
Bleaching Materials ,,	150,688	148,537	113,034	116,215
Borax..... ,,	117,375	149,710	115,120	120,290
Calcium Carbide... ,,	888,164	851,528	543,977	519,177
Coal Tar Products, not elsewhere specified value	—	—	1,045,771	369,714
Glycerine Crude....cwt.	19,921	42,903	74,566	95,447
Glycerine Distilled. ,,	4,324	7,182	19,068	25,032
Red Lead and Orange Lead .....cwt.	52,295	40,271	90,037	57,622
Nickel Oxide..... ,,	680	1,031	3,238	5,000
Potassium Nitrate (Saltpetre) .....cwt.	132,187	122,316	143,199	127,421
All other Compounds ,,	3,715,310	3,330,048	1,055,970	1,065,497
Sodium Nitrate ... ,,	1,570,801	1,552,589	945,092	831,930
All other compounds ,,	567,032	516,629	350,645	353,878
Tartar, Cream of.. ,,	46,380	39,908	186,998	175,201
Zinc Oxide .....tons	11,933	11,561	393,322	352,273
All other Sorts ..value	—	—	3,263,480	3,401,156
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	2,076,833	1,576,642	155,825	113,115
Bark Cinchona ....cwt.	16,255	21,040	69,805	95,522
Other Sorts.....value	—	—	1,709,708	1,843,205
DYES AND DYESTUFFS, ETC.—				
Intermediate Coal Tar Products .....cwt.	682	847	8,181	8,067
Alizarine..... ,,	1,033	879	34,186	34,183
Indigo Synthetic .. ,,	72	—	482	—
Other Sorts..... ,,	40,506	41,029	987,291	965,831
Cutch..... ,,	48,674	46,948	78,647	75,030
Other Dyeing Extracts cwt.	45,845	48,089	151,088	151,806
Indigo, Natural ... ,,	257	320	6,524	8,435
Extracts for Tanning ,,	1,285,853	1,348,481	1,319,228	1,496,182
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe .....cwt.	734,523	737,298	165,270	164,256
White Lead (dry) . ,,	143,616	165,968	228,062	256,463
All other Sorts .... ,,	1,118,177	1,262,972	1,516,929	1,674,123
Total of Chemicals, Drugs, Dyes, and Colours .....value	—	—	15,502,422	15,367,796

Exports

	Quantities Year ended December 31, 1927.	Quantities Year ended December 31, 1928.	Value Year ended December 31, 1927.	Value Year ended December 31, 1928.
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ....cwt.	63,176	96,028	35,819	44,203
Acid Tartaric ..... ,,	21,710	24,878	138,282	167,176
Ammonium Chloride (Muriate) .....tons	4,693	4,271	105,350	91,410
Ammonium Sulphate—				
To Spain and Canaries tons	87,190	98,407	852,981	943,119
,, Italy..... ,,	4,433	4,243	46,498	40,205
,, Dutch East Indies tons	9,497	25,750	104,149	267,402
,, Japan..... ,,	85,379	112,725	873,007	1,103,220
,, British West India Islands and British Guiana tons	7,031	12,250	72,904	121,193
,, Other Countries ,,	71,795	140,047	764,117	1,383,707
Total .... ,,	265,325	393,422	2,713,719	3,858,846
Bleaching Powder....cwt.	519,512	622,387	211,035	211,067
Coal Tar Products—				
Anthracene .....cwt.	1,746	1,348	967	630
Benzol and Toluol galls.	1,970,666	3,952,195	109,967	247,157
Carbolic Acid .....cwt.	147,631	257,435	291,562	454,185
Naphtha .....galls.	63,297	82,575	5,128	7,650
Naphthalene .....cwt.	11,305	49,863	8,363	21,617
Tar, Oil, Creosote Oil, etc.....galls.	40,732,577	41,812,819	1,413,806	1,455,456
Other Sorts .....cwt.	788,322	858,633	423,619	421,451
Total ...value	—	—	2,253,412	2,608,152
Copper, Sulphate of..tons	42,401	47,857	923,784	1,109,304
Disinfectants, Insecticides, Etc. .....cwt.	413,857	431,365	1,032,525	1,075,452
Glycerine, Crude .... ,,	23,093	22,728	71,406	64,418
Glycerine Distilled... ,,	104,618	129,550	512,615	463,326
Total .... ,,	127,711	152,278	584,021	527,744
Potassium Compounds—				
Chromate and Bi-chromate .....cwt.	30,741	28,247	55,479	51,132
Nitrate (Saltpetre). ,,	17,473	16,560	33,056	30,658
All other Sorts.... ,,	40,510	41,824	184,064	155,927
Total .... ,,	88,724	86,631	272,599	237,717
Sodium Compounds—				
Carbonate .....cwt.	5,432,871	4,958,427	1,623,099	1,385,186
Caustic..... ,,	2,110,145	2,140,359	1,520,039	1,429,091
Chromate and Bi-chromate..... cwt.	28,586	41,431	40,131	56,524
Sulphate, including Salt Cake .....cwt.	1,573,183	1,555,774	198,568	181,357
All other Sorts ... ,,	648,125	711,641	692,738	840,702
Total .... ,,	9,792,910	9,407,632	4,074,575	3,892,920
Zinc Oxide.....tons	982	1,243	42,280	49,017
CHEMICAL MANUFACTURES, ETC., all other sorts value	—	—	3,326,671	3,603,146
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) value	—	—	15,714,078	17,476,154
DRUGS, MEDICINES, AND MEDICINAL PREPARATIONS—				
Quinine and Quinine Salts .....oz.	1,972,155	2,134,635	202,765	207,408
All other Sorts....value	—	—	2,799,343	2,873,166
Total .... ,,	—	—	3,002,108	3,080,574
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	77,633	103,977	658,464	806,533
Other Sorts ..... ,,	88,159	100,165	94,284	99,248
Total .... ,,	165,792	204,142	752,748	905,781
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe.....cwt.	16,017	37,980	7,545	16,984
White Lead (dry).. ,,	54,855	52,533	101,781	98,229
Paints and Colours in paste form.....cwt.	589,531	537,745	1,246,688	1,079,026
Paints and Enamels Prepared .....cwt.	401,171	492,582	1,337,333	1,589,578
All other Sorts ... ,,	653,428	634,990	1,240,442	1,167,897
Total .... ,,	1,715,002	1,755,830	3,933,789	3,951,714
Total of Chemicals, Drugs, Dyes and Colours ...value	—	—	23,402,723	25,414,223

Re-Exports

	Quantities. Year ended December 31, 1927.	1928.	Value. Year ended December 31, 1927.	1928.
CHEMICAL MANUFACTURES AND PRODUCTS—			£	£
Acid Tartaric.....cwt.	1,622	1,195	10,718	9,722
Borax..... ,,	2,014	4,710	2,027	5,069
Coal Tar Products.value	—	—	2,931	72,259
Potassium Nitrate (Saltpetre).....cwt.	1,412	9,187	1,927	8,911
Sodium Nitrate ... ,,	43,054	31,635	26,439	16,872
Tartar, Cream of .. ,,	6,725	4,914	29,142	23,752
All other Sorts....value	—	—	330,622	275,491
DRUGS, MEDICINES, AND MEDICINAL PREPARATIONS—				
Quinine and Quinine Salts .....oz.	207,129	280,190	21,670	27,486
Bark Cinchona....cwt.	3,763	4,495	23,845	25,557
All other Sorts....value	—	—	419,332	394,141
DYES AND DYESTUFFS—				
Cutch .....cwt.	14,900	15,698	22,989	25,294
Other Dyeing Extracts cwt.	2,563	2,583	19,148	17,261
Indigo, Natural ... ,,	138	172	3,663	4,550
Extracts for Tanning ,,	18,716	9,141	26,102	11,272
PAINTERS' COLOURS AND MATERIALS.....cwt.	20,281	23,903	55,939	68,741
Total of Chemicals, Drugs, Dyes and Colours....value	—	—	1,012,401	1,021,011

Steel Under Pulsating Stresses

Professor P. B. Haigh's Paper

PROFESSOR P. B. HAIGH read a paper entitled "The Relative Safeties of Mild- and High-Tensile Alloyed Steels Under Alternating and Pulsating Stresses" before the Chemical Engineering Group of the Society of Chemical Industry, on Friday, January 11.

The use of alloyed steel, he said, was now firmly established in several branches of engineering, and its application appeared likely to extend more widely—in directions in which mild steel had hitherto been used almost exclusively. The advantages and dangers associated with such a change of material deserved careful consideration. The advantages were gained in the main from reductions of weight consequent upon the use of smaller parts of the stronger material. One of the more important dangers was that smaller parts, of equal static strength, might be more liable to crack under the action of alternating or pulsating stresses.

It was well known that parts of structures and machines might break in a brittle manner if a moderate load—often much smaller than might have been applied in static tests or in brief overload or overspeed tests—was applied and removed or reversed continually. This mode of brittle fracture, following long-continued repetition of stress, was described as "mechanical fatigue." Different authorities had stated that 90 per cent. of the fractures that resulted in breakdowns in service were attributable to fatigue; and although this proportion might perhaps be overstated, there was no real doubt that fatigue cracking was, in fact, one of the most common causes of fracture in service.

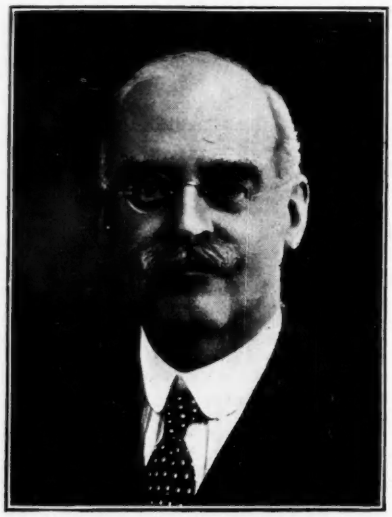
The standard scantlings and "factors of safety" in general use among engineers to-day were based largely on experience of mild steel, which had proved itself one of the most reliable of metals and a very good friend to the engineer and shipbuilder. It should not be assumed hastily that the same "factors of safety" were necessarily suitable when other metals are used.

Professor Haigh reviewed and discussed a wide variety of tests and experiments with alternating and pulsating stresses, to illustrate and contrast the conditions in which fatigue cracking might be a source of danger. It was shown that the relation between the fatigue strength and yield strength of mild steel was such that fatigue cracking was necessarily uncommon in mild steel in practical experience with ordinary conditions of loading. In high-tensile steels the relation between the two kinds of strength was often such that fatigue cracking was more frequent.

Death of Sir John Brunner

WE regret to announce the death of Sir John Fowler Brunner, which occurred at his residence, Harrington Gardens, London, on Wednesday. He had been ill ever since the by-election at Cheltenham last September, in which he stood as Liberal candidate and was defeated by Sir Walter Preston. About a fortnight ago he became seriously ill.

Sir John Fowler Brunner was the eldest and only surviving son of the Right Hon. Sir John Tomlinson Brunner, who with Dr. Ludwig Mond, father of Lord Melchett, established the great chemical firm of Brunner, Mond and Co. Born in



THE LATE SIR JOHN BRUNNER.

1865, he was educated at Cheltenham, the Zurich Polytechnic, and Trinity Hall, Cambridge. For many years he was a director of Brunner, Mond and Co., and became a director of Imperial Chemical Industries, Ltd., at the time of its formation, resigning in October, 1927. He was chairman of the Brunner Investment Trust, Madeley Collieries, Ltd., and Park Hall Colliery, Ltd.; director of Shirebrook Colliery, Ltd., the Oxford and Shipton Cement Co., Ltd., and Copartnership Tenants, Ltd.; a member of the council of the Federation of British Industries; and a life member of the council of Cheltenham College. In 1906 he became Liberal Member of Parliament for the Leigh Division of Lancashire. In January, 1910, he was elected for the Northwich Division of Cheshire, losing the seat in December, 1918. He was again elected for Southport, in 1923, but was subsequently defeated in 1924.

He married, in 1894, Lucy Marianne, daughter of Mr. O. V. Morgan, and is succeeded in the baronetcy (to which he himself succeeded as second baronet in 1919) by his only son, Mr. Felix John Morgan Brunner, who was born in 1897, and married, in 1926, Dorothea Elizabeth, daughter of the late Mr. H. B. Irving, and granddaughter of the late Sir Henry Irving. The new baronet is a director of Madeley Collieries, Ltd., and Park Hall Colliery, Ltd.

Canadian Sodium Sulphate Production

THE Dominion Bureau of Statistics has just published finally revised statistics on the production of sodium sulphate in Canada during 1927. Natural sodium sulphate shipped from Canadian deposits during 1927 totalled 5,659 tons, evaluated at $11,319, as compared with a total of 6,775 tons, valued at $13,550, produced in 1926. Importations of salt cake into Canada in 1927 were recorded at 42,333 tons, appraised at $686,458.

Keg and Drum Manufacturers' Association

IT is understood that the formation of a national association of manufacturers of kegs and drums is being considered by members of the industry. Among the matters which will receive consideration by the association, when formed, will be the question of obtaining protection for the British keg and drum manufacturing industry.

The Development of Nitrocellulose Finishes

A Paper Read Before the Oil and Colour Chemists

At a meeting of the Oil and Colour Chemists' Association held at the Institute of Chemistry, London, on Thursday, January 10, Mr. Bertram Campbell read a paper on "Nitrocellulose Finishes."

Mr. Campbell said that, although the great expansion of the automobile industry since the war and the insistent demand for a new finishing material to eliminate the delays consequent on the use of oleo-resinous paints and varnishes had created the general impression that the nitrocellulose finish industry was a post-war development, it was the fact that the technique of the production and application of nitrocellulose finishes was well grounded many years before the automobile business. The nitrocellulose then available, however, was of the high viscosity type and suitable only for the production of relatively thin films. One of the most important factors contributing towards the rapid development of the nitrocellulose finishing industry in recent years had been the discovery of methods of reducing the viscosity of the nitrocellulose, a discovery which had rendered possible the advent of nitrocellulose finishes, not only in the automobile industry, but in many other directions where formerly oleo-resinous paints and varnishes, resin lacquers, and other materials were employed.

The War and After

During the war, intensive work on the pigmentation of nitrocellulose and acetyl cellulose solutions was carried out in this country at the Royal Aircraft Establishment, and what was believed to be the first systematic work on the proper evaluation of solvents for cellulose esters was carried out by E. W. J. Mardles. The real development in the industry, however, started with the ending of the war and was due to three factors, one economic and two of chemical significance. The economic factor was the expansion of the motor industry and the need for a finish of more rapid application and greater durability. The second factor was the accumulation of normal butyl alcohol, obtained as a by-product in the manufacture of acetone by fermentation of corn, and the third factor, of still greater importance, was the development of knowledge that pigmented nitrocellulose solutions could be applied to motor bodies and a finish of vastly improved resistance to weathering obtained.

Up to 1919 all lacquer products were based on nitrocellulose which in solution gave a relatively high viscosity, and a single application resulted in the deposition of very thin films. By the discovery of methods of reducing the viscosity of the nitrocellulose whilst retaining film strength, it became possible to produce lacquers with a more highly concentrated content of nitrocellulose.

Nitrocelluloses with low nitrogen content, *i.e.*, 10·5 to 11·2 per cent., were soluble in a benzol-alcohol mixture, and were used in the leather cloth industry. Those with a nitrogen content of 11·2 to 11·8 per cent. were soluble in ether-alcohol, and were used in photography and artificial silk manufacture. Nitrocelluloses containing 11·8 to 12·3 per cent. of nitrogen were readily soluble in ester solvents and ketones and found a wide variety of applications. Resins gave gloss, hardness, adhesion, etc., to lacquer films. Ester gum was the most used resin.

Softening Agents, Pigments, and Solvents

Speaking of softening agents, Mr. Campbell mentioned vegetable oils and plasticisers such as the alkyl phthalates and aryl phosphates. With regard to pigments and their influence in imparting almost indefinite resistance of nitrocellulose finish to sunlight—a clear film of nitrocellulose being extremely sensitive to ultra-violet rays—the importance of studying each pigment in relation to the vehicle it was to be used with was emphasised, because, if the content was too high, failure by cracking might occur, or there might be excessive chalking. If the content were too low, failure by checking would result very quickly.

Passing to the solvents and diluents employed, it was pointed out that usually a lacquer solvent combination was a complex mixture of low-boiling esters and aromatic hydrocarbons with high-boiling esters and alcohol. The low-boiling esters served to reduce viscosity and increase solids, the high-boiling solvents assisting in flow and preventing blushing. The solvents and diluents employed for brush application were of lower volatility than those used in spraying compositions, and it was emphasised that such solvents should have agreeable odours and a minimum lifting action on old paint and varnish films. The erroneous idea that the boiling point of a solvent or diluent was an index of its evaporation behaviour had greatly obstructed the efforts of the formulator, and other variables made prediction impossible on this basis. The most useful method of evaluating solvent volatility was the empirical one, *i.e.*, the actual determination of rates of evaporation at room temperature.

Solvent Combination

Mr. Campbell then dealt with the question of solvent combination as distinct from the characteristics of individual solvents and diluents. Commercial lacquers actually consisted of complex mixtures of nitrocellulose and resin with solvent and diluent. When proper admixture was secured the resultant material was a uniform colloidal dispersion, which in the case of clear lacquers, where the effect could best be observed, did not show any sign of cloudiness. When improper admixture of lacquer ingredients occurred, difficulties sometimes arose at the time of compounding, and on other occasions the material might give no sign of defect until it was applied to a surface and permitted to dry. A solution of nitrocellulose would tolerate the addition of some quantity of a non-solvent, but, after a critical point was reached, the addition of further non-solvent might cause a precipitation or gelling of the nitrocellulose.

In the same manner solutions of some resins in hydrocarbons or alcohols would tolerate the addition of a certain quantity of ester (nitrocellulose solvent), but the critical limit of tolerance might be reached in such instances also. Thus the amount of cheap diluent that it was possible to add to an expensive nitrocellulose solution to form a lacquer might depend largely on the limit of tolerance of the nitrocellulose solvent for the diluent, and hence the limit of tolerance of a nitrocellulose solvent mixture was an important property.

Coming to thinners, it was suggested that the best possible thinner for use with any satisfactory lacquer should consist of the same volatile ingredients that were present in the lacquer and in the same proportions. The trade tendency was to cheapen thinners as much as possible by employing only low-boiling solvents and by using large proportions of hydrocarbons. This tendency was to be deplored since the addition of extra "low-boilers" to a carefully balanced solvent formula might cause blush and additional hydrocarbon might have the same effect. The greatest economy should lie in employing thinners only for actually thinning lacquers and in using the proper ingredients for such a purpose.

Effect of Development of Nitrocellulose Finishes

Finally, the effects of the development of nitrocellulose finishes on related chemical fields was discussed. The growth of the nitrocellulose finish industry, said the author, had served to stimulate activity in a number of related chemical fields. The oleo-resinous paint and varnish industry first felt the impact of the new products in the rapid replacement by nitrocellulose finishes of paint and varnish in the automobile field.

Stirred to a hitherto neglected interest in the value of chemical research, the paint industry in general had broadened to a very marked extent its laboratory and research facilities, and already results in the form of improved products were making their appearance in the industry. Among such might be mentioned paint enamels of very much increased speed of drying, and more rapid baking automobile undercoats. The number of solvents available for use in nitrocellulose finishes had also been broadened by the development of new synthetic products whose production was a direct result of the demand created by nitrocellulose finishes.

The startling success of nitrocellulose finishes had served to stimulate a search for improved substitutes for the natural resins used in these finishes, and also for the possibility of replacing nitrocellulose itself.

The Future

At the present time, lacquer, in the sense of a product which dried by evaporation of solvents, appeared to have established a permanent place in the field of finishes for manufactured articles. A slow and steady growth would probably continue as newer uses developed. The period of spectacular development was undoubtedly over, but, with the tremendous activity in chemical research to which allusion had already been made, new discoveries of importance would probably serve to bring about radical changes in the components which played such important roles in the lacquer field. Nitrocellulose, while now fairly established, might be supplanted by another synthetic colloid body. New and cheaper solvent combinations would appear. The nitrocellulose finish industry was well aware of this trend, and an industry which had the example of the revolutionary results introduced by modern nitrocellulose finishes had little need for further incentive to keep it alert and intensively at work.

An Interesting Suggestion

An animated discussion followed the delivery of the paper. It was suggested by one speaker that the subject dealt with by the author was far too vast to be adequately dealt with in one lecture, and that the whole question of nitrocellulose finishes could very well be sectionalised and dealt with in a series of lectures.

The President associated himself with this comment and said that he felt inclined to suggest a symposium on the subject, although that would mean, probably, a whole day's meeting. Nevertheless, the Oil and Colour Chemists' Association was a live organisation, and a suggestion of this sort would not be allowed to fall upon deaf ears.

A cordial vote of thanks to the author was passed at the end of the meeting.

Ensuring the Safety of Workers

In the January number of *Industrial Welfare*, Mr. G. W. Malcolm, managing director of the Salt Union, Ltd., discusses the question of protecting workers against accident. "We have not," he states, "got any particular statistics showing the percentage of accidents which are attributable to the human factor, but we keep up a steady pressure on two points. Firstly the responsibility of the injured himself, very often the sole cause of an accident. Secondly, failure to report accidents immediately and have early attention to avoid septic consequences. Time and time again have men in our employ injured themselves by absolute disregard of works rules and of large notices on white enamelled iron in red letters, forbidding certain operations, such as oiling machinery in motion, etc. Time and time again have we refused to pay compensation for a considerable period, entirely to impress the sense of his folly on the mind of the injured man. In my opinion, the law requires some amendment on this point, as the decision is invariably against the employer because the accident arose 'in and out of the course of his employment,' and ignores the man's personal responsibility. I agree there is a difficulty there, inasmuch as in the event of death or continued incapacity, consequences fall upon the man's family, but I think there should be some modification of the employer's responsibility in cases of this kind. While, initially, there would be certain cases of hardship, the inevitable result in the long run would be that the men would get more careful with entirely beneficial results to themselves primarily, and to industry secondarily."

A Campaign Against Tariffs

The National Association of Merchants and Manufacturers have done well to publish at 1s. an interesting volume containing a report of the Mansion House meeting held in November last, extracts from the report of the World Economic Conference at Geneva in May, 1927, a plea for the removal of restrictions on European trade issued in 1926, an appeal by the bankers of the United Kingdom in 1921, a petition to Parliament by the merchants of the City of London in 1820, and a statement of the objects and scope of the National Association of Merchants and Manufacturers. All these documents together present an impressive case for the movement "to put an end to the increase in tariffs and to move in the opposite direction." The case is also well put in speeches at the Mansion House meeting by Mr. Walter Runciman, M.P., Mr. J. Beaumont Pease, Sir Ernest Benn, Mr. Lionel de Rothschild Sir Felix Schuster, Sir Hugh Bell, and Sir George Paish.

Fuel and Power Committee

Second Report

The "Second Report of the National Fuel and Power Committee" has just been issued (H.M. Stationery Office, pp. 46, 9d.). The report deals with a memorandum prepared by the National Gas Council relating to amendments of existing gas legislation, and another memorandum, prepared by the Board of Trade, outlining additional proposals. In a covering letter, Lord Melchett, chairman of the Committee, states that the memoranda were referred to a sub-committee, which produced the report now published. The members of the Committee are in substantial agreement with the sub-committee, and the report of the latter is to be regarded as the report of the Committee.

The proposals under examination are, for convenience, divided in the report into the following main headings:—Proposals of the National Gas Council and the Board of Trade for simplifying the procedure under which statutory gas undertakers obtain their powers and so facilitating the working of those undertakings; proposals of the Board of Trade for extending the operation of the thermal system of charging for gas and imposing on all gas undertakings, whether statutory or not, a standard of purity and pressure; proposals of the Board of Trade for conferring statutory powers on certain of the larger non-statutory gas undertakers, subject to the usual restrictions; miscellaneous proposals of the National Gas Council and the Board of Trade for amending in certain respects the Gas Regulation Act, 1920, and other general enactments applicable to gas undertakers, to render them suitable to present day requirements.

Recommendations

Among the recommendations made are:—The power of sliding scale companies to pay a fixed minimum dividend: the power of companies regulated by a maximum price and maximum rate of dividend to adopt standard price and sliding scale of dividend provisions; the power to offer new capital for subscription to existing holders, consumers and employees on terms to be approved by the Board of Trade; the power to institute an alternative method of charge; the power to authorise joint working arrangements between undertakings: the universal adoption (except in the case of quite small undertakings) of the thermal basis of gas supply, and that gas undertakers be required in future to conform to the requirements of the Gas Regulation Act as regards the purity and pressure of their gas (subject to certain reservations).

Conclusion

In the concluion of the report the sub-committee states that it has been impressed by the representations of the National Gas Council that the industry should be freed at the earliest possible moment from irksome restrictions, and it would urge, accordingly, that steps be taken without delay to promote legislation to give effect to the recommendations it makes.

Record Gypsum Production in Nova Scotia

The 1928 production of gypsum in Nova Scotia has been by far the largest in the history of the Province. The output was 974,000 tons, an increase of 122,000 tons. In connection with the Nova Scotia gypsum industry, scientific research has been carried out on the problems presented by the fact that in association with the gypsum deposits in the Province are large deposits of anhydrite. Heretofore, this material has been almost useless, but success of a practical nature has already been reported by the chemists employed at the Nova Scotia Technical College in an effort to discover a use for it. Gypsum and anhydrite are both forms of calcium sulphate, but in commercial gypsum only a certain low percentage of anhydrite can be permitted. When gypsum is heated in a furnace to a comparatively low temperature it loses its water and the addition of water subsequently causes it to set up in a hard mass as "Plaster of Paris." Anhydrite treated in the same manner will not harden and remains in the water as a loose white powder. It has now been shown that by grinding the raw anhydrite with certain very cheap salts a product is obtained which sets hard when mixed with water, in the same manner as plaster of Paris. Raw anhydrite burned at a high temperature and then mixed with water was found to set hard and to produce a material stronger than plaster of Paris and almost as strong as Portland cement.

A Group of Chemical Problems

Papers Before the Manchester Section

A MEETING of the Manchester Section of the Society of Chemical Industry was held on Friday, January 11, when a number of short papers were read. Mr. C. J. T. Cronshaw presided.

Cellulose Reactions

"Recent Progress in the Study of the Chemical Reactions of Cellulose" was the subject of a paper read by Dr. F. C. Wood, who stated that his object was to deal with some general impressions he had formed with regard to the results of research work published during the past ten years and to indicate in what way advances might possibly be made in the future. For approximately the last decade research workers had been endeavouring to prove that cellulose behaved like a hydroxyl body, and had been endeavouring to apply reactions, which were well known in the case of hydroxyl groups, to cellulose. Apparently it could not be disputed that there was not a single reaction of cellulose which had not its counterpart in the reactions of hydroxyl substances in general, and it was only necessary to ascertain new reactions with hydroxyl groups to learn immediately how they could be applied to cellulose.

Dr. Wood then gave a summary of some of the main reactions of cellulose and alkali cellullose, and pointed out that it was clear that alkali cellulose was a very important substance in the synthetic chemistry of cellulose. There had been considerable controversy as to whether molecular compounds of hydroxide and cellulose were obtained, but the bulk of the evidence was in favour of the establishment of such molecular compounds. Some years ago Dr. Clibbens, of the Shirley Institute, laid stress on the analogy between the reactions of cellulose and the reactions of sugars and other hydroxyl bodies. It appeared to be probable that compounds of caustic soda did exist with cellulose, so that the basis of the mercerisation process was undoubtedly chemical; the result produced was physical, but the first reaction was chemical.

Improvements in Stentering Operations

In a paper on "The Efficiency of the Present-day Finishing Stenter," Mr. N. S. A. Humphries laid before the section some suggestions which were not necessarily practical at the moment, but which might cause some of his hearers to devise improvements in present-day stentering operations adopted in bleaching and finishing works. Such a machine was one over which the majority of cotton piece goods must pass before they could be placed upon the market. The finishing stentering process worked under the most efficient conditions cost, approximately, from $\frac{1}{12}$d. to $\frac{1}{8}$d. for every yard of cloth passed over the machine, and a reduction of even so little as $\frac{1}{16}$d. per yard in any of the fabrics produced in Lancashire might mean the difference between selling that fabric and having it left on the manufacturer's hands. Economy in expenditure could be effected in two ways. The first, and perhaps the most obvious, was to increase the rate of production per unit either of time or of labour, or at any rate per unit of capital, to be spent on the machine. The other method was by introducing some new feature in the machinery employed. If a more efficient stentering machine could be devised, it would be possible to effect economies in both directions.

The adaptation of finishing stenters to permit the use of recirculated air was a very important point. Observations taken in the stenter chamber showed that the rise in relative humidity in the air in the chamber was nothing like so great as might be expected, and probably did not reach more than 20 per cent. An even greater efficiency in this direction was desirable. Mather and Platt had now brought out a new device for drying cloth by superheated steam. The machine was being run by means of recirculated superheated steam at a running speed of no less than 76 yards per minute. The moisture taken up by the process every minute was 9·17 lb., and the amount of steam condensed was 23 lb. per minute. The coal consumption for every lb. of steam evaporated was 0·44 lb.

New Oxygen Carrier for Dyeing and Printing Processes

In a paper on this subject Mr. F. Scholefield drew attention to a new oxygen carrier which was likely to be of use in certain textile processes. He stated that some time ago Mr. R. H. Clayton, of the Manchester Oxide Co., had drawn his attention to the existence of the carbonyl ferrocyanides and suggested that they might possibly have some application in industry. Quoting from the literature upon the subject, Mr. Scholefield explained that the carbonyl ferrocyanides existed in spent oxide of iron and in "cyanogen mud," products obtained in the purification of coal gas, and could be recovered fairly easily from the crude mother liquor resulting from the working up of these two purification products for the production of sodium or potassium ferrocyanide. Prussiates of soda and potash were used in dyeing aniline blacks, especially in the printing trades for printing aniline black, and as oxygen carriers in conjunction with chlorate of potash or soda or the discharging of indigo, sulphur, basic, direct, azoic and other dyestuffs. It appeared of interest to ascertain whether sodium carbonyl ferrocyanide could be used as a substitute for prussiate in the production of aniline blacks and what advantages, if any, might be obtained.

Solutions of aniline salts, sodium chlorate, and potassium ferrocyanide, on the one hand, and of aniline salt, sodium chlorate and sodium carbonyl ferrocyanide on the other, were prepared, and cotton cloth was padded in these solutions and dried, aged $2\frac{1}{2}$ minutes at 100° C., chromed, washed and dried. The prussiate-treated material assumed a light green shade, whilst the carbonyl-treated material remained yellow. This appeared to indicate that at low temperatures the oxidising power of the carbonyl compound was less than that of the prussiate, and this difference might constitute a valuable technical quality in the carbonyl compound, since the liability of the aniline black padding liquor to oxidise on the cloth was inconvenient and often led to losses in the production of discharge effects on aniline black. Even at a temperature of 80° C. the ageing of the aniline proceeded much more slowly with the carbonyl compound than with the prussiate, but at a temperature of approximately 100° C. the effectiveness of the carbonyl compound was greater than that of the prussiate, since the latter, under comparable conditions, left the ager in the emeraldine stage, while in the former case the carbonyl compound caused the formation of a much blacker aniline oxidation product. The actual change taking place had not yet been investigated.

Comparisons were made with smaller amounts of prussiate and carbonyl compound over a range from 45 to 5 grams per litre. From the results it appeared that 30 grams of carbonyl compound per litre gave results comparable with those from 45 grams of prussiate per litre. In the dyeing or printing of aniline blacks, the weakening or tendering of the material was a serious matter. In a large number of comparisons between prussiate and carbonyl it had been found, without a single exception, that a black dyed with carbonyl had maintained its strength appreciably better than that produced by prussiate.

Nitro-Acyl-Sulphuric Acids and Their Reduction Products

In their paper on this subject Dr. G. N. Burkhardt and Mr. H. Wood dealt with matters of pure organic chemistry. The object of the initial research work undertaken was to ascertain if stable products could be obtained from the more acid nitrophenols as mixed anhydrides, and, if such derivatives could be obtained, whether there were any interesting members among the ordinary series of reduction products. All the methods of preparation of the materials were applicable to cellulose and similar methods had been applied to sugars, and sulphates had been obtained. Although such strong reagents as chlor-sulphonic acid and SO_3 were used, they could be weakened down so that they acted quite smoothly on so sensitive a substance as phenol. They almost certainly would not break up cellulose if they would not break up phenol.

Key Industries Duty: Paraphenetidine

A REPRESENTATION has been made to the Board of Trade under Section 10 (5) of the Finance Act, 1926, regarding paraphenetidine. Any communication on the matter should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, within one month from the date of this notice (January 15). Section 10 (5) of the Finance Act deals with exemption from the duty imposed by the Safeguarding of Industries Act, 1921.

From Week to Week

MR. C. HABBERJAM has been appointed a mining engineer to the Nobel section of I.C.I.

THE CHILEAN GOVERNMENT, it is reported, is making arrangements for the present nitrate scheme to be prolonged, possibly for ten years.

GEORGE BROOKES, aged 28, a workman at the Billingham synthetic ammonia works, was admitted on Monday to the local hospital suffering from injuries to the head, from which he died a few hours later.

THE CHEMICAL INDUSTRY CLUB will hold its next monthly meeting on Monday, January 21, at 8 p.m., when Professor J. C. Drummond will speak on "The Significance of the Infinitely Little in Biochemistry."

MR. R. G. BARTON, of Winsford, Cheshire, has been appointed a director of the Salt Union. He was until recently proprietor of John Garner and Co.'s Bridge Salt Works, Winsford, which has been acquired by the Salt Union.

THE NEW PLANT of the Norsk Hydro Company for the production of nitrogen compounds, which is being erected jointly with the I.G. will be completed this summer. The production will be increased to 600,000 tons of "Norge" saltpetre per annum.

MR. A. B. CRAVEN has been elected president of the British Section of the International Society of Leather Trades Chemists for 1929. Other election results are as follows: vice-president, F. C. Thompson, M.Sc.; hon. treasurer, Dr. D. Burton; hon. secretary, R. F. Innes, F.I.C.; members of committee, W. R. Atkin, M.Sc., and Dr. A. Turnbull.

DR. CARL DUISBERG, chairman of the board of the I.G. Farbenindustrie, is reported by the *Times of India* to have arrived in Bombay with his wife. Dr. and Mrs. Duisberg, who are on a tour round the world, propose to spend a month in Ceylon and British India, and their stay in India is reported to have no connection with business.

A DISCUSSION on "Industrial Cancers" (the second of a series of discussions on Poisoning and Disease in Industry) will be opened by Professor R. D. Passey, Director of Cancer Research at Leeds University, before a meeting of the Yorkshire Section of the Society of Chemical Industry which will be held at the Great Northern Hotel, Leeds, on January 21, at 7.15 p.m.

NOBEL HOUSE, Buckingham Gate, hitherto the headquarters of Imperial Chemical Industries, Ltd., and adjacent flats, shops, and dwelling houses, with the Crown leases, are, by direction of the company, in consequence of its removal to new buildings in Millbank, to be offered for sale by auction on February 21, unless previously disposed of, by Chesterton and Sons.

THE OLD-ESTABLISHED DRUGGISTS business of Sangers has been acquired by a new company "Sangers, Ltd." which offered for subscription this week 250,000 7½ per cent. cumulative preference shares of £1 each at par, and 125,000 ordinary shares of 5s. each at 2s. premium. The business was originally established about 1780 in Oxford Street, London, as retail druggists, but for a long time it has been an entirely wholesale business, and it will still remain so.

BRITISH CARBOCITE SMOKELESS FUEL made an issue of 1,050,000 ordinary shares of 2s. each, at par, on Thursday. The company has been formed to take over the British patents and to manufacture and sell "Carbocite Smokeless Fuel." Works are in course of erection at West Thurrock, Purfleet, and a contract for the total output for two years has been entered into. Negotiations are pending for the erection of similar plants at various collieries, to be worked on a royalty basis.

THE GOVERNORS of the Sir John Cass Technical Institute, Jewry Street, Aldgate, London, are extending their existing courses in fuel technology by an advanced and post-graduate course on "Coal Carbonisation," and the inaugural lecture will be delivered by Dr. Sinnatt, of the Fuel Research Board, on January 28, at 7 p.m. The actual course of lectures, 12 in number, will be entitled "Coal Carbonisation, Theory and Practice—Part I," and will be delivered by Mr. H. D. Greenwood, at 7 p.m. on Monday evenings, commencing February 4. The syllabus for Part II of the course, which will be held during the sessions 1929-30, will be issued later.

MR. G. J. GREENFIELD, manager of the Fell Coke Works of the Consett Iron Co., Ltd., has been appointed works manager of Thorncliffe Coal Distillation, Ltd., one of the subsidiary companies of Newton Chambers and Co., Ltd., of Sheffield. The Thorncliffe Co. is replacing its present coke-oven plant with a new installation, consisting of 59 Becker ovens capable of dealing with 1,200 tons of wet coal per day. Mr. Greenfield, who will also take over control of the Newton Chambers' Carr distillation plant and disinfectant works, will succeed Mr. Robert Ray as this year's president of the Coke Oven Managers' Association. Mr. Greenfield, who has been with the Consett company for seven years, will start at Sheffield on April 1.

ORDINARY SHARES of Imperial Chemical Industries, Ltd., were expected to be placed on the New York market last week at about 11·25 dollars a share.

DR. E. F. ARMSTRONG, F.R.S., has been appointed a director of the South Metropolitan Gas Co., in place of Mr. Edward Honoratus Lloyd, K.C., who recently retired from the board.

DR. WILLIAM CULLEN (of Cullen and Ronaldson, chemical and mining engineers, 4, Broad Street Place, London), has been chosen as president-elect of the Institution of Mining and Metallurgy for the coming year.

AN ARRANGEMENT was announced last week between two well-known companies in the tar macadam industry, whereby Constable, Hart and Co. acquire the business of J. Smart and Sons and take full control. The staff of Smart and Sons are being retained under the new management.

COLONEL SIR EDWARD ALLEN BROTHERTON sailed from Liverpool on Friday, January 4, on the *Duchess of Atholl*, for an extended tour in South America and South Africa, and is expected to return to Yorkshire in May. Among the places visited will be the lonely island of Tristan da Cunha in the Southern Atlantic, and Palestine.

THE DIRECTORS of Imperial Chemical Industries, Ltd., announce that they have appointed to the board of the company, and to its executive committee, Mr. J. H. Wadsworth, who has been secretary of Imperial Chemical Industries, Ltd., since its incorporation. Mr. P. C. Dickens has been appointed secretary in the place of Mr. Wadsworth.

THE WEST BROMWICH CORPORATION on Monday were the prosecutors in an action against the proprietors of the Stonehouse Works, where artificial manures and fish and bone meals are made, complaining of a nuisance. Several witnesses, including the G.W.R. stationmaster, complained of the smells emitted from the works. The hearing was adjourned to a date to be fixed.

SILICA GEL, LTD., announce that their offices have been moved to the sixth floor of Bush House, and that their postal address, as from January 1, is: Silica Gel Ltd., Bush House (West Wing), Aldwych, London, W.C.2. The new telephone numbers are "City 0188-89," and the telegraphic addresses "Silicagel, Estrand, London" (inland), and "Silicagel, London" (foreign).

RECENT WILLS INCLUDE: Mr. James Robert Scott, of East Grinstead, Sussex, and Bush House, Aldwych, a director of the United Molasses Co., Ltd., of the British Molasses Co., Ltd., of the Pure Cane Molasses Co., Ltd., of the United Mining and General Trust, Ltd., and of the Mashaba Rhodesian Trust, Ltd., £347,526.—Mrs. Lily Morton, wife of Mr. Frederick Morton, chemical manufacturer, £5,061.

A COURSE of three lectures on "The Treatment of Coal" is to be given by the Director of Fuel Research, Department of Scientific and Industrial Research, Dr. C. H. Lander, at the Royal Society of Arts, John Street, Adelphi, London, W.C.2, on Monday evenings, January 21 and 28, and February 4, at 8 o'clock. The first of these lectures (Cantor Lectures, Session 1928-29) will deal with the use of coal in its raw state, the second with high-temperature carbonisation processes and coke treatment, and the third with low-temperature carbonisation.

ARTIFICIAL SILK NEWS.—Plans for the establishment of large artificial silk works embracing the manufacture of acetate as well as super-viscose silk are reported to be under the consideration of the Breda Artificial Silk Group. One factory, it is expected, will be in Belgium and another in Germany.—The I. G. is said to contemplate the purchase of a large block of shares in the Enka concern.—The output of artificial silk in the United States in 1928 amounted to 98,650,000 lb., and consumption exceeded 110,000,000 lb. The leading producers will increase output this year.

THE CAUSE OF THE DEATH of a chemical worker named Thomas Butler, 60 years of age, of Crumpsall, Manchester, who had been engaged for 27 years in the dyestuffs industry, was investigated by a Manchester jury last week. Dr. A. Henshaw said that death was due to a malignant growth set up from the fumes which Butler would meet with at his work. The disease had been set up very, very slowly, in fact during the 27 years Butler had been engaged in this work. In reply to the Coroner, Dr. Henshaw said that the Cancer Research Association were making experiments in regard to the mortality among chemical workers, but it would take very many years before they got a definite result, because the impregnation was, as in this case, spread over a very long period. He had had another case during the past six months, and here also the victim was a chemical worker. These cases were very rare in the population generally, and the disease took a long time to develop even in chemical workers. On the advice of the Coroner, the jury returned an open verdict, which, the Coroner remarked, would not prejudice any proceedings elsewhere.

Obituary

MR. H. Y. V. JACKSON, assistant general manager (technical) of the Anglo-Persian Oil Co., Abadan, and a native of Manchester, at Abadan, on Saturday, January 5.

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ORGANIC.—The "normal" structures of aldoses and ketoses. H. Kiliani. *Zeitschrift angewandte Chem.*, January 5, pp. 16–17.

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SILICIC ACID.—Preparation of pure silicic acid by means of electrodialysis. 1.—Electrodialysis. 2.—Some properties of silicic acid. S. Oka. *J. Soc. Chem. Ind. Japan* (supplemental binding), December, 1928, pp. 306–307B, 307–308B (in English).

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

301,778. METAL CARBONYLS, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 5, 1927.

In the production of carbonyls from a metal and carbon monoxide the yield is small if the metal is in compact form. In this invention, the activity of the metal is increased by subjecting it to an oxidising treatment and then to a reducing treatment. The material retains its shape, but is highly porous. The process can be applied to the treatment of the metal residues obtained in the production of carbonyls, which could not previously be reactivated. Examples are given of the treatment of iron turnings, hammer scale, etc.

301,853. CATALYSTS FOR THE OXIDATION OF GASES WITH AIR OR OXYGEN, MANUFACTURE OF. B. Lambert, "Fircroft," Park Town, Oxford, and National Processes, Ltd., 27, Old Broad Street, London, E.C.2. Application date, September 6, 1927.

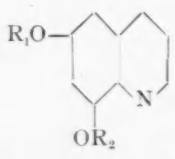
The object is to obtain hydrated chromium oxide which will absorb increased quantities of oxygen when heated in air to 350–400° C. A solution containing 10 per cent. of chromium nitrate or chloride is treated with a solution of one part of caustic soda in two parts of water to precipitate chromium hydroxide in the form of a hydrogel. The precipitate is washed, and then has the power of adsorbing insoluble or slightly soluble bases from solutions of their salts, *e.g.*, the acetate of calcium, magnesium, nickel, chromium, or zinc. The hydrogel containing the adsorbed base is then washed, filtered and dried, and finally heated in air to 350–400° C. The product is a very active catalyst for oxidising gases such as sulphur dioxide.

301,946. RECOVERY OF SOLUBLE PRODUCTS FROM COAL, ETC. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date September 1, 1927.

Coal or other carbonaceous material is heated to 100–600° C. in a closed vessel under a pressure of 2–100 atmospheres. The coal is then treated while still hot with a solvent in a closed vessel at an increased pressure. The solvent may be benzene, hydrogenated naphthalenes, alcohols, ketones, petroleum, mineral oils, tar oils, etc. The soluble products may be further treated by cracking or destructive hydrogenation. Resins, waxes, etc., are obtained.

301,947. ETHERS OF 6 : 8-DIOXY-QUINOLINE, PRODUCTION OF. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 1, 1927.

Mono- and diethers of 6 : 8-dioxyquinolines are obtained by treating 6 : 8-dioxyquinoline with an alkylating agent; the diethers are obtained in a similar manner from the monoethers. The same products are obtained from derivatives of 4-amino-1-3-resorcinol containing the desired alkyl or amino-alkyl residues attached to the hydroxyl groups, by subjecting them to Skraup's synthesis. The ethers have the general formula.



where R_1 and R_2 represent the same or different alkyl- or amino-alkyl residues in the case of diethers, and R_1 or R_2 represents hydrogen in the case of the monoethers.

301,949. HYDROCARBONS, MANUFACTURE OF. J. A. A Zacon, 13, Rue de Coulmiers, Toulouse (Haute Garonne) France. Application date, September 7, 1927.

Coal is pulverised and agitated with water and mineral oil. The mixture of coal and oil is separated and injected into a chamber where it is subjected to an electric arc or spark at a pressure of 150 atmospheres and temperature of 300° C. in the presence of hydrogenation catalysts. The gaseous products are expanded, cooled, and condensed, and the liquid is distilled and fractionated. One of the fractions may be used for mixing with a futher quantity of coal.

301,956. AMINOALKYL ETHERS OF OXIMES AND THEIR SALTS, MANUFACTURE OF. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 9, 1927.

These products are obtained by the reaction of salts of oximes with amino-alkyl halogenides. Some examples are given.

301,969. CATALYTIC CONVERSION OF HYDROCARBON, APPARATUS FOR. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 15, 1927.

In the conversion of hydrocarbons into hydrogen or mixtures of hydrogen and carbon monoxide by passing them with water vapour or carbon dioxide, with or without air, over catalysts, the reaction is highly endothermic and it is difficult to heat the reacting materials. In this invention, a catalyst activated with alumina is arranged in tubes resistant to high temperatures constructed of chromium-nickel alloys. The tubes are raised to 600–1,000° C. by external heating, so that the heating medium does not come into contact with the catalyst. The hydrocarbons may be subjected to a preliminary treatment to remove organic sulphur compounds by passing the gas over copper to absorb the sulphur compounds or over metal oxides heated to 300° C. to convert these compounds into sulphuretted hydrogen, which is then removed. Some examples are given of the treatment of coal gas.

302,129. AMMONIUM VANADATE AND VANADIUM PENTOXIDE. MANUFACTURE OF. J. A. Weil, 115, Withington Road, Whalley Range, Manchester, H. Rawlinson, 48, Speke Road, Hunt's Cross, Liverpool, and Imperial Chemical Industries, Ltd., Broadway Buildings, Westminster, London, S.W.1. Application date, July 3, 1928.

Vanadic acid usually contains impurities such as oxides of iron, aluminium, copper, chromium, and nickel, alkaline earths, and silica in gel form. Ammonium vanadate prepared from the vanadic acid usually contains impurities in gel form and other adsorbed impurities. It is now found that these impurities are not redissolved if ammonium vanadate is dissolved in water at a temperature corresponding to its maximum solubility. Ammonium vanadate can then be precipitated by adding an ammonium salt such as a nitrate which yields no reducing gaseous products on thermal decomposition. Vanadium pentoxide obtained on decomposing the purified ammonium vanadate by heat is of high catalytic activity.

302,191. ETHERS OF CARBOHYDRATES, MANUFACTURE OF. O. Y. Imray, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 9, 1927.

Ethers of carbohydrates of high molecular weight such as cellulose or starch are obtained by causing the alkylating agent in the form of gas or vapour to act on the semi-moist carbohydrate in the presence of alkali at a raised temperature. The concentration of the alkali cellulose may be increased by evaporating the water in vacuo, with or without simultaneous addition of alkali. The molecular proportion of alkali to carbohydrate should be less than 20 to 1. The alkali cellulose is subjected to the action of alkyl halide vapour, which is pumped through it in a closed circuit including a cooling device and a heating device. Examples are given of the treatment of cotton, wood-cellulose, sulphite cellulose, and starch.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 273,684 (Chemische Fabrik auf Aktien, vorm. E. Schering), relating to condensation of *m*- and *p*-cresol and aliphatic ketones, see Vol. XVII, p. 221; 273,686 (Chemische Fabrik auf Actien, vorm. E. Schering), relating to alkyl-isopropylene-phenols and alkylated cumaranes, see Vol. XVII, p. 222; 274,439 (Chemische Fabrik auf Actien, vorm. E. Schering), relating to alkylated phenols and hydrogenated products, see Vol. XVII, p. 291; 275,636 (I.G. Farbenindustrie Akt.-Ges.), relating to condensation products of the anthraquinone series, see Vol. XVII, p. 352; 276,010 (Chemische Fabrik auf Actien, vorm. E. Schering), relating to thymol, its isomers or homologues, and hydrogenation products, see Vol. XVII, p. 373; 279,072 (I.G. Farbenindustrie Akt.-Ges.), relating to destructive hydrogenation of coal, tars, mineral oils, etc., see Vol. XVII, p. 557; 279,855 (Schering Kahlbaum Akt.-Ges.), relating to alkyl-isopropyl-phenols and their hydrogenation products, see Vol. XVIII, p. 14; 282,004 (I.G. Farbenindustrie Akt.-Ges.), relating to anthraquinone derivatives, see Vol. XVIII, p. 127; 283,931 (H. F. Porter), relating to magnetic alloys, see Vol. XVIII, p. 31 (Metallurgical Section); 288,572 (Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann), relating to diazo compound and dyestuffs therefrom, see Vol. XVIII, p. 555; 293,040 (Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler), relating to sodium-nitrogen compounds, see Vol. XIX, p. 219.

International Specifications not yet Accepted

300,130. HYDROCYCLIC COMPOUNDS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. (Assignees of O. Diels and K. Alder, 2, Brunswikerstrasse, Kiel, Germany.) International Convention date, November 5, 1927.

Hydrocyclic compounds are obtained by condensing a compound having conjugated double bonds with a quinone or an unsaturated compound such as an unsaturated aldehyde, ketone, or acid. The double bond compounds include butadiene, cyclopentadiene, cyclohexadiene, myrcene, phellandrene, pyrrol, and furanes, and the unsaturated compounds include maleic acid or anhydride, citraconic anhydride, acrylic acid, acrolein, and ethylidene-acetone. The products comprise terpenes, sesqinterpenes, alkaloids, and camphors. A number of examples are given.

300,167. SYNTHETIC RUBBER. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 7, 1927. Addition to 286,272. (See THE CHEMICAL AGE, Vol. XVIII, p. 440.)

Polymerizing agents for the polymerization of hydrocarbons include glue and sodium sulphate in an atmosphere of oxygen, glue and potassium iodide in the presence of carbon dioxide, casein, lime, and hydrochloric acid, egg albumen and sodium bisulphite.

300,178. DYES AND INTERMEDIATES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 7, 1927.

Safranine dyestuffs are obtained by oxidation of a 4-acidyl-amino-3^1-amino- or 4-nitro-3^1-amino-diphenylamine-sulphonic acid or homologue or derivative with a *p*-phenylene-diamine or a derivative. The acidylamino group in the product may be saponified and the nitro groups reduced and the lenco compound oxidised. Examples of such components are given, such as 4-acetamino-3^1-amino-4^1-methyldiphenylamine-2-sulphonic acid and 4-amino-4^1-methoxy-diphenylamine-2-sulphonic acid. The production of these components is also described.

300,208. VULCANIZING RUBBER. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 8, 1927.

A vulcanisation accelerator consists of an alicyclic base, or a derivative or compound. The basic group may be in a ring, as in decahydroquinoline, decahydroquinaldine, perhydromethylindol, or in non-cyclic combination such as hexahydromethyl toluidine. Examples are given.

300,264. PURIFYING SULPHONIC AND NAPHTHENIC ACIDS. De Bataafsche Petroleum Maatschappij, 30, Carel van Bylandtlaan, The Hague. International Convention date, November 11, 1927.

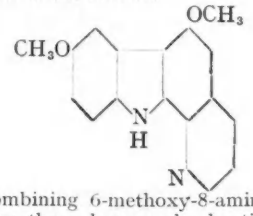
The acids are precipitated from their aqueous solutions as such or as salts by adding a volatile electrolyte such a hydrochloric, nitric, or acetic acid. The impurities remain in the aqueous solution.

300,271. ZIRCONIUM SULPHITE AND OXIDE. Kali-Chemie Akt.-Ges., 10, Reichstagsufer, Berlin. (Assignees of Rhenania-Kunheim Verein Chemischer Fabriken Akt.-Ges., 10, Reichstagsufer, Berlin.) International Convention date, November 11, 1927.

Zirconium ore is heated with quicklime and carbon, then treated with hydrochloric acid, and the solution treated with sulphurous acid or a sulphite to precipitate zirconium bisulphite which is treated to obtain the oxide.

300,279. QUINOLINE-INDOLE COMPOUNDS. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 11, 1927.

A quinoline-indole of the formula



is obtained by combining 6-methoxy-8-aminoquinoline with 1-bromo-2-nitro-4-methoxy-benzene by heating with alcohol, sodium acetate, and copper bronze, reducing the nitro group to the amino group, diazotizing the product, and heating the azo-imino compound in α-methyl-naphthalene till nitrogen ceases to be evolved.

300,503. OXYETHYL-AMINOBENZENE DERIVATIVES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 12, 1927.

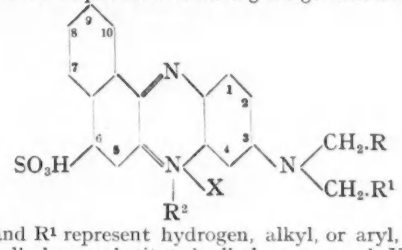
A nucleal substitution product of 4-amino-1-oxybenzene is treated with glycol-halogen-hydrin or ethylene oxide to obtain the N-mono and di-oxyethyl derivatives. An acid-binding agent, a diluent, a solvent and/or a catalyst may be present. The products are photographic developers, and examples are given.

300,504. DYES. I. G. Farbenindustrie, Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 12, 1927.

Diazotized halogen-substituted 1-amino-3:5-dimethyl-benzenes are coupled with arylides of 2:3-oxynaphthoic acid or of β-keto-carboxylic acids. The azo dyes obtained are of good fastness to kier-boiling, chlorine, and light. A number of examples are given.

300,549. DYES. J. R. Geigy Akt.-Ges., 51, Riehenring, Basle, Switzerland. International Convention date, November 14, 1927. Addition to 265,986, 284,614, 284,615, 285,486, and 297,441.

An unsymmetrical N-alkylated-*p*-phenylene-diamine-sulphonic acid in which the sulphonic group occupies the ortho position to the primary amino group is condensed with an isorosinduline-6-sulphonic acid having the general formula



where R and R^1 represent hydrogen, alkyl, or aryl, R^2 represents an alkyl or substituted alkyl group, and X an acid radical, positions 1, 2, 8, 9, 10 being possibly occupied by a monovalent radical such as a halogen, hydroxy, alkyloxy, methyl, acidylamino or sulphonic group. The 6-sulphonic group is removed during the condensation as described in specifications 265,986, 284,614, and 284,615 (See THE CHEMICAL AGE, Vol. XVI, p. 382, Vol. XVIII, pp. 326, 327).

The products are acid wool dyestuffs fast to alkali and light. Similar dyestuffs are obtained by using pheno-naphtho-safranines having an alkyl or substituted alkyl group attached to the *meso* azine nitrogen in the sulphonation processes of specifications 285,486 and 297,441 (See THE CHEMICAL AGE, Vol. XVIII, p. 368 and Vol. XIX, p. 497). Examples are given.

300,629. Potassium Carbamate and Carbonate. Kali-Industrie Akt.-Ges., C. T. Thorssell, and A. Kristensson, 139, Hohenzollernstrasse, Kassel, Germany. International Convention date, November 18, 1927.

Potassium chloride is treated with ammonium carbamate in presence of liquid ammonia, yielding solid potassium carbamate. This is washed with liquid ammonia and heated with a little water to separate ammonia with or without carbon dioxide, leaving potassium carbonate. The ammonium chloride obtained is treated for the recovery of ammonia.

Latest Notifications.

303,494. Production of concentrated acetic acid. Suida, Dr. H. January 5, 1928.

303,495. Production of acetic acid. Suida, Dr. H. January 5, 1928.

303,742. Dehydration of aqueous formic acid. Soc. Anon. Distilleries Des Deux-Sevres. January 7, 1928.

303,505. Motor fuels and methods of making the same. Carbide and Carbon Chemicals Corporation. January 6, 1928.

303,482. Process for the cleansing of alkali lyes. Winternitz, R. January 4, 1928.

303,514. Precipitating-baths for making threads or the like from viscose. I.G. Farbenindustrie Akt.-Ges. January 5, 1928.

303,451. Packing of footwear and the manufacture of packing-material suitable therefor. I.G. Farbenindustrie Akt.-Ges. January 3, 1928.

303,520. Process for the manufacture of carbazole derivatives. I.G. Farbenindustrie Akt.-Ges. January 5, 1928.

303,526. Process for the manufacture of water-insoluble azo dyestuffs. I.G. Farbenindustrie Akt.-Ges. January 5, 1928.

303,527. Process for the manufacture of diazonium fluro-sulphonates. I.G. Farbenindustrie Akt.-Ges. January 6, 1928.

Specifications Accepted with Date of Application

274,058, 302,984–5 Alkylamino-alkylamino derivatives of aromatic compounds, Manufacture of. I.G. Farbenindustrie Akt.-Ges., and A. Carpmael. July 8, 1926, and June 23, 1927. Additions to 267,169 and 274,058.

275,258. Azo dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 29, 1926.

277,715. Nitrogenised metallic compounds, Production of. R. B. Goldschmidt and S. Coulier. September 20, 1926.

278,689. Accelerator of vulcanisation. Goodyear Tire and Rubber Co. October 8, 1926.

279,419. Calcium cyanamide or mixtures containing the same, Production of. N. Caro and A. R. Frank. October 23, 1926.

280,945. Stable diazo compounds, Manufacture of. Soc. of Chemical Industry in Basle. November 18, 1926. Addition to 238,704.

288,605. Extracting pure nickel from its various alloys. Soc. Anon. Le Nickel. April 13, 1927.

290,179. Dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. May 7, 1927.

291,462. Non-ferrous alloys, Manufacture of. Metropolitan Vickers Electrical Co., Ltd. June 4, 1927.

299,473. Oxidation of leuco compounds of the triaryl-methane series. I.G. Farbenindustrie Akt.-Ges. October 28, 1927.

301,486. Calcium nitrate and ammonium nitrate, Method of producing a mixture of. Kungstdunger Patent-Verwertungs-Akt.-Ges. December 1, 1927.

302,964. Nitro-anthraquinones, Reduction of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). September 22, 1927.

302,965. Azo-dyestuffs, manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). September 22, 1927.

303,038. Distillation of oils, coal tar, and other liquids. Gas Light and Coke Co. W. G. Adam. and F. M. Potter. August, 27, 1927.

303,042. Metallurgical furnace. D. Cushing. September 26, 1927.

303,044. Substituted guanidines, Process for the manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). September 26, 1927.

303,072. Ores, Treatment of—with gases in rotary furnaces. C. P. Debuch. July 27, 1927.

303,093. Derivatives of aromatic amino-oxy and poly-amino compounds, Process for the manufacture of. I.G. Farbenindustrie Akt.-Ges., and A. Carpmael. June 23, 1927. Addition to 267,169 and 274,058.

303,094. Refining or purifying metals and alloys, Processes and apparatus for. F. W. Corsalli. June 23, 1927. Addition to 297,759.

303,097. Therapeutical compounds, Process for the manufacture of. I.G. Farbenindustrie Akt.-Ges. and A. Carpmael. June 23, 1927. Addition to 267,169 and 274,058.

303,184. Vat dyestuffs, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). June 27, 1927.

303,192. Carrying out exothermic catalytic gas reactions and apparatus for. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). September 23, 1927.

303,203. Vat dyestuffs and intermediate products thereof. A. Carpmael (*I. G. Farbenindustrie Akt.-Ges.*). September 30, 1927.

303,206. Operating blast furnaces, Method of. A. E. White. (*S. G. Allen*). August 30, 1926.

303,207. Reducing ores to obtain ferro alloys, Method of. A. E. White. (*S. G. Allen*). August 30, 1926.

303,243. Basic and acid dyes of the Rhodamine type. Imperial Industries, Ltd., and L. J. Allchin. November 7, 1927.

303,258. Solid polymerised formaldehyde, Manufacture and production of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). December 2, 1927.

303,268. Catalytic oxidation of organic compounds. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). December 21, 1927.

303,281. Sulphonated products, Production of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). January 13, 1928.

303,323. Diolefines, Manufacture and production of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). April 30, 1928.

303,328. Antimonial lead alloys and other antimonial metals, Purification. H. Harris. May 29, 1928.

303,095. Halogenated ms-benzdianthrones and ms-naphthodianthrones, Manufacture and production of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). June 27, 1927.

Applications for Patents

Bakelite Corporation and Wade, H. Phenol resin moulding mixtures. 724. January 8.

Bakelite Corporation and Wade, H. Moulding Mixtures. 1,175. January 12.

Bogdandy, S. von and Polanyi, M. Production of chemical compounds. 1,060. January 11. (Germany, January 12, 1928).

Borchers, R., Krebs, H. and Manseld Akt.-Ges. für Bergbau and Hüttenbetriel. Production of sulphuric acid. 1,056. January 11. (Germany, January 24, 1928.)

Carpmael, A. and I.G. Farbenindustrie Akt.-Ges. Manufacture of substituted ureas. 955. January 10.

Carpmael, A. and I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 1,169, 1,170. January 12.

Carpmael, A. and I.G. Farbenindustrie Akt.-Ges. Process for treating roads, etc. 1,171. January 12.

Crawford, J. W. C. and Imperial Chemical Industries, Ltd. Preparation of pigments, etc. 817. January 9.

Favre, G. A. Production of anhydrous stannic chloride. 574. January 7. (Switzerland, January 18, 1928.)

Geigy, Soc. Anon., J. R. Dyestuffs. 662. January 8. (Germany, February 20, 1928.)

Hill, R., Imperial Chemical Industries, Ltd. and Walker, E. E. Manufacture of synthetic resinous compositions. 849. January 9.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of highly-concentrated paraffin wax. 578. January 7.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Apparatus for production of pure sulphur. 579. January 7.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of liquid hydrocarbons, etc. 580. January 7.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of carbon black. 797. January 9.

I.G. Farbenindustrie Akt.-Ges. and Imray, O. Y. Treating azo-dyestuffs. 1,176. January 12.

I.G. Farbenindustrie Akt.-Ges. Manufacture of benzine, etc. 577. January 7. (Germany, January 13, 1928.)

I.G. Farbenindustrie Akt.-Ges. Production of motor fuels. 796. January 9.

I.G. Farbenindustrie Akt.-Ges. Manufacture of decomposition products from iron sulphates. 829. January 9. (Germany, January 9, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of extracts having a heart-stimulating action. 925. January 10. (October 17, 1927.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of monoazo dyestuffs. 956. January 10. (Germany, January 10, 1928.)

I.G. Farbenindustrie Akt.-Ges. Process of printing with dyestuffs. 1,074. January 11. (Germany, January 27, 1928.)

I.G. Farbenindustrie Akt.-Ges. Kinematographic apparatus. 1,075. January 11. (Germany, January 11, 1928.)

I.G. Farbenindustrie Akt.-Ges. Kinematographic apparatus. 1,076. January 11. (Germany, January 20, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of hydroxy carboxylic acids of carbazole. 1,086. January 11. (Germany, January 12, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of treads for tyres. 1,159. January 12. (August 30, 1928.)

Imperial Chemical Industries, Ltd. Lined vessels. 786. January 9.

Imperial Chemical Industries, Ltd. Removal of carbon from gases. 1,007. January 11.

Imperal Chemical Industries. Ltd. Arc welding. 1,087. January 11.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall., pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised, 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3½d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2½d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 6¾d. per lb. Crude 60's, Jan., 1s. 11d. per gall.; Feb./Mar., 1s. 10½d. per gall.

ACID CRESYLIC 99/100.—2s. 5d. to 3s. per gall. 97/99.—2s. 2d. to 2s. 3d. per gall. Pale, 95%, 1s. 11d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £5 per ton.

ANTHRACENE OIL, STRAINED.—7¾d. to 8d. per gall. Unstrained, 7¼d. to 7½d. per gall.

BENZOLE.—Prices at works: Crude, 10d. to 10½d. per gall.; Standard Motor, 1s. 4d. to 1s. 4½d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 5d. to 1s. 10d. per gall. Firm. Pure, 1s. 10d. to 2s. 2d. per gall.

XYLOL.—1s. 3d. to 1s. 11d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.

CREOSOTE.—Cresylic, 20/24%, 8¾d. per gall.; Heavy, 7d. to 7½d. per gall. Middle oil, 5¾d. to 6¼d. per gall. Standard specification, 5¼d. to 5½d. per gall. ex works. Salty, 7¼d. per gall.

NAPHTHA.—Crude, 8½d. to 9d. per gall. Solvent 90/160, 1s. 1½d. to 1s. 2½d. per gall. Solvent 95/160, 1s. 2d. to 1s. 6d. per gall. Solvent 90/190, 11d. to 1s. 3d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet. Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 35s. to 37s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 4s. 3d. to 6s. 6d. per gall. 90/180, 2s. 3d. to 3s. per gal. Heavy, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100 %.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—5½d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—2s. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITHROBENZENE.—8½d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 10d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£75 10s. per ton.

CHARCOAL.—£6 to £8 15s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall, 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CREOSOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 6d. per gall. Solvent, 4s. to 4s. 1d. per gall.

WOOD TAR.—£3 to £4 per ton.

BROWN SUGAR OF LEAD.—£39 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb., according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £54 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅝d. to 5⅞d. per lb.

LAMP BLACK.—£32 10s. per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPHONE, 30%.—£23 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£10 to £12 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 10d. to 7s. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4d. to 2s. 5d. per lb.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz., according to quantity.

Acid, Boric B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—2s. 1d. to 2s. 3d. per lb.
Acid, Gallic.—2s. 8d. per lb. for pure crystal, in cwt. lots.
Acid, Pyrogallic, Crystals.—7s. 3d. per lb. Resublimed, 8s. 3d. 10½d. per lb.
Acid, Salicylic, B.P. pulv.—1s. 4½d. to 1s. 6d. per lb. Technical.—10½d. to 11½d. per lb.
Acid, Tannic B.P.—2s. 8d. to 2s. 10d. per lb.
Acid, Tartaric.—1s. 4½d. per lb., less 5%.
Acetanilide.—1s. 5d. to 1s. 8d. per lb. for quantities.
Amidol.—7s. 6d. to 9s. per lb., d/d.
Amidopyrin.—7s. 9d. to 8s. per lb.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity. 18s. per lb. ex Gum.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
Atropine Sulphate.—9s. per oz.
Barbitone.—5s. 9d. to 6s. per lb.
Benzonaphthol.—3s. to 3s. 3d. per lb. spot.
Bismuth Carbonate.—9s. 9d. per lb.
Bismuth Citrate.—9s. 3d. per lb.
Bismuth Salicylate.—8s. 9d. per lb.
Bismuth Subnitrate.—8s. 3d. per lb.
Bismuth Nitrate.—Cryst. 5s. 9d. per lb.
Bismuth Oxide.—12s. 3d. per lb.
Bismuth Subchloride.—10s. 9d. per lb.
Bismuth Subgallate.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
Bismuthi et Ammon Liquor.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts., 11d. per lb.
Borax B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
Bromides.—Ammonium, 2s. to 2s. 3d. per lb.; potassium, 1s. 8½d. to 1s. 11½d. per lb.; sodium, 1s. 11d. to 2s. 2d. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.
Calcium Lactate.—B.P., 1s. 3d. to 1s. 5d. per lb.
Camphor.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
Chloral Hydrate.—3s. 2d. to 3s. 4d. per lb.
Chloroform.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
Creosote Carbonate.—6s. per lb.
Ethers.—S.G. ·730—11d. to 1s. 0d. per lb., according to quantity; other gravities at proportionate prices.
Formaldehyde, 40%.—37s. per cwt., in barrels ex wharf.
Guaiacol Carbonate.—4s. 6d. to 4s. 9d. per lb.
Hexamine.—1s. 11d. to 2s. 2d. per lb.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 12os. per oz.
Hydrogen Peroxide (12 vols.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
Hydroquinone.—3s. 9d. to 4s. per lb., in cwt. lots.
Hypophosphites.—Calcium, 2s. 9d. per lb.; potassium, 3s. per lb.; sodium, 2s. 11d. per lb., in 1 cwt. lots, assorted.
Iron Ammonium Citrate.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb.; U.S.P., 2s. 9d. to 3s. per lb.
Iron Perchloride.—18s. to 20s. per cwt., according to quantity.
Iron Quinine Citrate.—B.P., 8½d. to 9½d. per oz., according to quantity.
Magnesium Carbonate.—Light commercial, £31 per ton net.
Magnesium Oxide.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
Menthol.—A.B.R. recrystallised B.P., 21s. 6d. per lb. net; Synthetic, 10s. to 11s. per lb.; Synthetic detached crystals, 11s. to 16s. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.
Mercurials B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph., B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
Methyl Salicylate.—1s. 3d. to 1s. 6d. per lb.
Methyl Sulphonal.—8s. 9d. to 9s. per lb.
Metol.—9s. to 11s. 6d. per lb. British make.
Paraformaldehyde.—1s. 9d. per lb. for 100% powder.
Paraldehyde.—1s. 4d. per lb.
Phenacetin.—2s. 5d. to 2s. 8d. per lb.
Phenazone.—3s. 9d. to 4s. per lb.
Phenolphthalein.—6s. to 6s. 3d. per lb.
Potassium Bitartrate 99/100% (Cream of Tartar).—96s. per cwt., less 2½ per cent.
Potassium Citrate.—B.P.C., 2s. 6d. to 2s. 9d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb., in cwt. lots.
Potassium Iodide.—16s. 8d. to 17s. 2d. per lb., according to quantity.
Potassium Metabisulphite.—6d. per lb., 1-cwt. kegs included, f.o.r. London.
Potassium Permanganate.—B.P. crystals, 5½d. per lb., spot.
Quinine Sulphate.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
Resorcin.—2s. 10d. to 3s. per lb., spot.
Saccharin.—47s. per lb.; in quantity lower.
Salol.—2s. 3d. to 2s. 6d. per lb.
Sodium Benzoate, B.P.—1s. 8d. to 1s. 11d. per lb.
Sodium Citrate, B.P.C., 1911—2s. 3d. to 2s. 6d. per lb., B.P.C. 1923—2s. 8d. to 2s. 9d. per lb. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
Sodium Ferrocyanide.—4d. per lb., carriage paid.
Sodium Hyposulphite, Photographic.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—95s. to 100s. per cwt. Crystals, 5s. per cwt. extra.
Sodium Salicylate.—Powder, 1s. 6½d. to 1s. 7d. per lb. Crystal, 1s. 7d. to 1s. 8d. per lb.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 1d. per lb.
Sodium Sulphite, Anhydrous.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
Sulphonal.—6s. 6d. to 6s. 9d. per lb.
Tartar Emetic, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
Thymol.—Puriss., 9s. 6d. to 9s. 9d. per lb., according to quantity. Firmer. Natural, 12s. 6d. per lb.

Perfumery Chemicals

Acetophenone.—6s. 6d. per lb.
Aubepine (ex Anethol).—11s. per lb.
Amyl Acetate.—2s. 6d. per lb.
Amyl Butyrate.—4s. 6d. per lb.
Amyl Salicylate.—2s. 9d. per lb.
Anethol (M.P. 21/22° C.).—5s. 3d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—1s. 10d. per lb.
Benzyl Alcohol free from Chlorine.—1s. 10d. per lb.
Benzaldehyde free from Chlorine.—2s. 6d. per lb.
Benzyl Benzoate.—2s. 3d. per lb.
Cinnamic Aldehyde Natural.—15s. 6d. per lb.
Coumarin.—8s. 6d. per lb.
Citronellol.—10s. per lb.
Citral.—8s. 3d. per lb.
Ethyl Cinnamate.—6s. per lb.
Ethyl Phthalate.—2s. 9d. per lb.
Eugenol.—12s. per lb.
Geraniol (Palmarosa).—20s. per lb.
Geraniol.—6s. 6d. to 10s. per lb.
Heliotropine.—4s. 9d. per lb.
Iso Eugenol.—16s. per lb.
Linalol.—Ex Bois de Rose, 13s. per lb. Ex Shui Oil, 9s. 3d. per lb.
Linalyl Acetate.—Ex Bois de Rose, 17s. 6d. per lb. Ex Shui Oil Linalol. 10s. 6d. per lb
Methyl Anthranilate.—8s. per lb.
Methyl Benzoate.—4s. per lb.
Musk Ketone.—34s. per lb.
Musk Xylol.—7s. per lb.
Nerolin.—3s. 9d. per lb.
Phenyl Ethyl Acetate.—11s. per lb.
Phenyl Ethyl Alcohol.—10s. per lb.
Rhodinol.—45s. per lb.
Safrol.—1s. 8d. per lb.
Terpineol.—1s. 6d. per lb.
Vanillin.—16s. 6d. per lb.

Essential Oils

Almond Oil.—Foreign S.P.A., 10s. 6d. per lb.
Anise Oil.—2s. 9d. per lb.
Bergamot Oil.—23s. per lb.
Bourbon Geranium Oil.—21s. per lb.
Camphor Oil.—9d. per lb.
Cananga Oil, Java.—12s. per lb.
Cinnamon Oil Leaf.—7s. per oz.
Cassia Oil, 80/85%.—6s. 9d. per lb.
Citronella Oil.—Java, 2s. 1d. per lb., c.i.f. U.K. port. Ceylon, pure, 1s. 10½d. per lb.
Clove Oil (Pure 90/92%).—9s. 6d. per lb.
Eucalyptus Oil, Australian, B.P. 70/75%.—2s. per lb.
Lavender Oil.—Mont Blanc, 48/50%, Esters, 16s. 9d. per lb.
Lemon Oil.—14s. 9d. per lb.
Lemongrass Oil.—4s. per lb.
Orange Oil, Sweet.—21s. per lb.
Otto of Rose Oil.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
Palma Rosa Oil.—13s. per lb.
Peppermint Oil.—Wayne County, 15s. 6d. per lb.; Japanese, 8s. 6d. per lb.
Petitgrain.—8s. 6d. per lb.
Sandalwood.—Mysore, 28s. per lb., 95% 18s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, January 17, 1929.

WITH stocktaking practically completed, the demand for general chemicals is broadening and prices in the main continue firm. Export business continues interesting, and a greater volume of shipments is taking place.

General Chemicals

ACETONE continues in active request at firm prices of £77 to £85 10s. per ton, according to quantity, with supplies still rather on the short side.

ACID ACETIC is in fair demand at unchanged prices of £36 10s. to £37 10s. per ton.

ACID CITRIC.—Only a small business is passing and price is now steady at 2s. 2d. to 2s. 4d. per lb., less 5%.

ACID LACTIC.—A fair business is reported at £43 per ton for standard pale technical quality, 50% weight.

ACID FORMIC.—Price has now steadied at £43 per ton for 85% with a good inquiry.

ACID OXALIC.—Business is more active both for early and forward delivery and price holds firm at £30 10s. to £32 10s. per ton according to quantity.

ACID TARTARIC is only in moderate demand at 1s. 4¼d. to 1s. 4¾d., less 5%.

ARSENIC.—Inquiry has been a little better, but price shows no improvement at £16 per ton f.o.r. mines.

AMMONIUM CHLORIDE.—Substantial business is being placed and price is inclined to harden. Large dog tooth crystals still in short supply.

ALUMINA SULPHATE continues active, and price is firm at £6 15s. to £7 per ton with makers well sold forward.

BARIUM CHLORIDE is a bright market with a heavy demand and little material available for near delivery. Small spot lots on offer at £11 to £11 10s.

COPPER SULPHATE.—Further increases are reported, and present price is about £28 with usual discount. Makers are well sold forward and early delivery is difficult.

CREAM OF TARTAR.—Demand is reviving, and price is inclined to be slightly firmer. Present price about £95 to £97 10s. for best B.P. 99/100%.

FORMALDEHYDE.—This product appears to be finding its way into a number of new processes, and consumption is improving. Price continues firm at £39 per ton.

LEAD ACETATE.—Price holds firm at £42 10s. for white and £41 10s. for brown, and inquiry is active.

LEAD NITRATE.—A fair trade is passing at £36 delivered U.K.

LIME ACETATE.—A heavy inquiry is being received for grey quality which is still in short supply and price runs about £18 per ton.

LITHOPONE.—Slightly higher prices are quoted at £19 15s. to £21 per ton according to quality and a good demand continues.

METHYL ACETONE is sold freely at £58 to £60 per ton for 45% material with market firm.

METHYL ALCOHOL has been in good request and remains a firm market.

POTASSIUM CHLORATE.—Unchanged at £28 to £30 per ton and in good request.

POTASSIUM CARBONATE AND CAUSTIC.—Unchanged.

POTASSIUM PERMANGANATE.—The cheaper parcels which were recently on offer appear now to have disappeared and market is now firmer at about 5¾d. for best B.P. quality.

POTASSIUM PRUSSIATE.—This product tends to harden and supplies are not so plentiful. Price unchanged at firm rates of £63 10s. to £65 10s. according to quantity.

SODIUM ACETATE.—Inquiry is brisk and a fair business is passing. Price continues firm at £21 to £22 per ton, and spot supplies still continue limited.

SODIUM BICHROMATE.—The market is now settled at the new figures and a fair business has been done. Present price 3½d. per lb. with rebates for contracts.

SODIUM CHLORATE is in good request and firm at about £25 ton.

SODIUM NITRITE.—Demand is increasing and price is unchanged at £20 per ton.

SODIUM PHOSPHATE is in fair demand at about £12 per ton for Dibasic and £17 10s. for Tribasic material.

SODIUM HYPOSULPHITE.—Inquiry is increasing and prices show no change.

SODIUM PRUSSIATE is firm at 4½d. to 5½d. per lb.

SODIUM SULPHIDE is in satisfactory demand at unchanged prices.

TARTAR EMETIC.—Unchanged at 10½d. to 11d. according to quantity.

ZINC SULPHATE.—Good business is passing at about £12 per ton.

Coal Tar Products

There is more activity in the coal tar product market. A better tone has been noted during the past week, and a fair amount of business has been passing.

MOTOR BENZOL remains scarce, the price being about 1s. 7½d. to 1s. 8d. per gallon, f.o.r. makers' works.

SOLVENT NAPHTHA is unchanged at 1s. 11½d. per gallon f.o.r.

HEAVY NAPHTHA remains at 1s. 1d. to 1s. 1½d. per gallon on rails.

CREOSOTE OIL is unchanged, at 5½d. per gallon in the North and at 6d. per gallon in London.

CRESYLIC ACID remains weak, the 98/100% quality being obtainable at about 1s. 10d. per gallon, and the Dark quality, 95/97%, at 1s. 8d. per gallon, f.o.b.

NAPHTHALENES.—The firelighter quality is quoted at £4 10s. per ton, the 74/76 quality at £5 per ton, and the 76/78 quality at £6 to £6 5s. per ton.

PITCH remains unchanged, at 35s. to 37s. per ton, f.o.b., with little demand.

Nitrogen Products

Sulphate of Ammonia.—The market continues firm, and there has been more inquiry for export. Some orders have been received for prompt shipment from West Indies. Prices continue unchanged at £10 per ton, f.c.b. U.K. port in single bags for January shipment, and £10 2s. per ton for February shipment and onwards. The home market has been a little more animated, and quite a fair number of orders have been placed for the spring.

Nitrate of Soda.—There is nothing fresh to report. The demand for this article will not begin until later.

Latest Oil Prices

LONDON, January 16.—LINSEED OIL was barely steady. Spot ex mill, £29; January to April, £28 2s. 6d.; May-August, £28 7s. 6d., and September-December, £28 17s. 6d. RAPE OIL was firm and again 10s. per ton higher. Crude extracted, £42; technical refined, £44, naked, ex wharf. COTTON OIL was steady. Egyptian, crude, £30; refined common edible, £35 10s.; and deodorised, £37 10s., naked, ex mill. TURPENTINE was quiet. American, spot, 48s.; and February-April, 48s. 9d. per cwt.

HULL, January 16.—LINSEED OIL, spot to August, £28 5s.; September-December, £28 12s. 6d. per ton, naked. COTTON OIL.—Egyptian crude, new, spot and January-February, £29 5s.; edible refined, spot and January-February, £32 10s.; technical, spot, £32 5s.; deodorised, spot, £34 10s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £36 15s. per ton, naked. GROUNDNUT OIL.—Crushed/extracted, £38; deodorised, £42 per ton. SOYA OIL.—Extracted and crushed, £32; deodorised, £35 10s. per ton. RAPE OIL.—Crude/extracted, £40 10s.; refined, £42 10s. per ton. TURPENTINE.—Spot, 50s. per cwt., net cash terms, ex mill. CASTOR OIL and COD OIL unaltered.

South Wales By-Products

THERE is slightly more activity in South Wales by-products, the inquiry and the demand having strengthened. Business, however, is still far from satisfactory, and values generally are unchanged. Pitch continues to be quoted round about 35s. to 37s. per ton, and has a fair demand. Refined tars are maintaining their healthier tone, but prices are unchanged, coke oven tar being quoted at 7d. to 7¼d. per gallon delivered, and gasworks tar at from 6½d. to 7d. per gallon delivered. Crude naphthalene, which remains firm at round about 80s. per ton, is receiving scarcely any attention, while a similar remark applies to whizzed at round the 100s. per ton mark. Patent fuel and coke exports are maintaining their slight improvement. Values are unchanged, patent fuel, ex-ship Cardiff, being firm at 20s. to 21s. 6d. per ton; ex-ship Swansea, from 19s. 6d. to 19s. 9d. per ton. Coke, best foundry, is 32s. 6d. to 37s. per ton; furnace, from 19s. to 21s. per ton.

"Raw Materials of Commerce"

RAW MATERIALS OF COMMERCE is the title of a new serial publication issued by Sir Isaac Pitman and Sons, Ltd. The venture, which is written by J. Henry Vanstone assisted by specialist contributors, will be complete in 24 fortnightly parts, price 1s. 3d. each part. The first part (32 pp.) was issued on Wednesday, and dealt with the general introduction, cotton, flax and jute.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, January 16, 1929.

DURING the past week the heavy chemical market has been rather more active, good inquiry being received both for home and export business. There are no changes in prices of any importance to record.

Industrial Chemicals

ACETONE, B.G.S.—£77 10s. to £85 per ton, ex wharf, according to quantity. There is still little available for immediate delivery.

ACID ACETIC, 98/100%.—Glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton; powder, £32 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Quoted 6⅜d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Rather easier and now quoted 2s. 4d. per lb., less 5%, ex wharf.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC.—80° quality, £24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer from the Continent at 3¼d. per lb., ex wharf. Spot material quoted 3½d. per lb., ex store. In better demand.

ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality; £5 15s. per ton for 168° quality; dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 4½d. per lb., less 5%, ex wharf. Offered for prompt shipment at 1s. 4d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—On offer at £5 10s. per ton, c.i.f. U.K. ports; spot material quoted £5 15s. per ton, ex store.

ALUM, LUMP POTASH.—Quoted £8 7s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent. Crystal meal quoted £8 10s. per ton, ex store.

AMMONIA ANHYDROUS.—Quoted 9½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Manufacturers advise a reduction in price of £1 per ton from January 1. Lump quality now quoted £36 per ton; powdered, £38 per ton, packed in 5 cwt. casks, delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K.

ANTIMONY OXIDE.—Offered for spot delivery at £36 15s. per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £18 10s. per ton, ex wharf, prompt dispatch from mines. Spot material on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—Rather firm and now quoted at £10 2s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent.

BLEACHING POWDER.—British manufacturers contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacture, price, £4 5s. to £4 15s. per ton, according to quality and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

COPPER SULPHATE, 98/100%.—Market much stronger. Now quoted £26 per ton, ex wharf.

FORMALDEHYDE, 40%.—Some spot material available at about £37 10s. per ton, ex quay.

GLAUBER SALTS.—English material unchanged at £5 per ton, ex store or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—On offer at £29 10s. per ton, ex store

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 per ton, ex store. Brown on offer at about £31 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 4d. per gallon, less 2½%, delivered.

POTASSIUM BICHROMATE.—Manufacturers advise price for delivery during first six months of this year to be 4¼d. per lb., delivered U.K. or c.i.f. Irish ports with allowance of 2½% for minimum 2½ tons to be taken during the period.

POTASSIUM CARBONATE, 96/98%.—Offered from the Continent at £25 per ton, c.i.f. U.K. ports. Spot material available at £26 per ton, ex store.

POTASSIUM CHLORATE.—99¾/100%, POWDER.—Quoted £22 15s. per ton, c.i.f. U.K. ports.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the Continent at 6⅞d. per lb., ex wharf. Spot material quoted 7d. per lb., ex store.

SODA, CAUSTIC.—Manufacturers advise reduction in the higher strengths. Powdered, 98/99%, now £17 10s. per ton in drums, £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums, 70/72%, £14 2s. 6d. per ton in drums, all carriage paid, buyer's station, minimum 4-ton lots, for contract 10s. per ton less.

SODIUM ACETATE.—On offer for prompt delivery at about £21 5s. per ton, ex store.

SODIUM BICARBONATE.—No change in price for this year. Refined recrystallised £10 10s. per ton ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Price during first six months of this year, 3½d. per lb., delivered U.K. or c.i.f. Irish ports, less 2½% for contract of minimum 2½ tons.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, 27s. 6d. per ton. extra. Light soda ash, £7 3s. 9d. per ton, ex quay, minimum 4-ton lots with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—The Chilian Committee have advised a reduction of 1s. per ton of price ruling up to date. Price for January delivery now £10 7s. per ton, carriage paid, buyer's sidings, minimum 6-ton lots. Usual extras for refined qualities.

SODIUM SULPHATE (SALTCAKE).—Prices, 50s. per ton, ex works, 52s. 6d. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: Solid, 60/62%, £9 per ton; broken, 60/62., £10 per ton; crystals, 30/32%, £7 2s. 6d. per ton, delivered buyer's works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra. Prices for this year unchanged.

SULPHUR.—Flowers, £12 per ton; roll, £10 15s. per ton; rock, £10 12s. 6d. per ton; ground American, £9 5s. per ton; ex store.

ZINC CHLORIDE, 98%.—British material now quoted £22 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Etablissements Kuhlmann Developments

THE shares of the Etablissements Kuhlmann, the French chemical firm, were listed on the Amsterdam Exchange a few days ago. The capital of Etablissements Kuhlmann, which has been established for over a hundred years, was increased a year ago from Frs. 200,000,000 to Frs. 250,000,000 by the authorisation of 200,000 new shares, of which 50,000 were taken up by an American consortium headed by Dillon Read and Co., of New York. During 1928, the company's sales of fertilisers and inorganic chemical products increased 20 per cent., and dyestuffs and organic products 25 per cent. One-third of the company's output was exported. The interests controlled by Etablissements Kuhlmann are international in scope. In addition to nineteen plants and forty-three sales agencies which it owns in France and Belgium, the company has interests in coal, coke, chemical, electro-chemical and power concerns in these countries and in Morocco and Spain also. Net profits have shown a steady increase during the past four years, rising from Frs. 21,000,000 in 1924 to Frs. 34,000,000 in 1927, dividends of 12 per cent. being paid in 1924 and 1925, and of 16 per cent. in 1926 and 1927.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, January 17, 1929.

There has been a fair volume of inquiry about in the chemical market during the past week, although for the most part it relates to small or medium-sized parcels. The actual movement of certain lines has been on a moderate scale, with the bulk of the current transactions relating to prompt or early delivery business, with a fair flow of specifications against contracts. Quotations keep up pretty well all round.

Heavy Chemicals

Sulphide of sodium is currently offered at about £9 10s. per ton for the 60-65 per cent. concentrated solid material and £8 for the commercial grade, and a moderate trade is being put through. There is a quiet demand about for chlorate of soda, with virtually no change in the price situation, values ranging from 2¾d. to 3d. per lb. Alkali meets with a fair amount of inquiry, with contract offers of this material at round £6 per ton. Phosphate of soda this week has been only in relatively limited request, but quotations are held at round £12 5s. per ton. With regard to prussiate of soda, the demand in this section of the market is about up to its recent moderate level and prices are firm at from 4½d. to 5¼d. per lb., according to quantity. Offers of bichromate of soda are on the steady basis of 3½d. per lb., and buying interest is on a fairly satisfactory scale. Caustic soda is well held at from £12 15s. up to £14 per ton, according to quality, and in contract lots, the demand being pretty good. There is not a great deal of interest being shown just now in hyposulphite of soda; the photographic grade is quoted to-day at about £15 5s. per ton and the commercial material at £9. A moderate trade is going through in the case of saltcake, values of which are maintained at the revised level of £2 10s. per ton. Bicarbonate of soda is still very firm at round £10 10s. per ton, and a fairly active business is being done. With regard to bleaching powder, contract deliveries are on a moderate scale and at from £7 to £7 5s. per ton; prices in this section keep fairly steady.

Only a comparatively quiet demand has been experienced here for permanganate of potash, but quotations show no sign of ease, the commercial grade selling at about 5¼d. per lb., and the B.P. material at from 5¼d. to 5½d. per lb. Current sales of chlorate of potash are at round 3d. per lb. and a moderate business is being transacted. Yellow prussiate of potash is firm and there is a certain amount of inquiry in circulation, with offers at from 6¾d. to 7¼d. per lb., according to quantity. Bichromate of soda keeps steady and is in fair request at 4½d. per lb. There has been no alteration in the position either of caustic potash or carbonate; caustic is quoted at £33 5s. per ton for prompt delivery of one to five-ton lots, and carbonate at about £26 5s.

Sulphate of copper maintains its firmness and a steady business is being done in this material at up to £27 10s. per ton, f.o.b. Arsenic is still a comparatively dull section; buying interest is still restricted, and values are little better than about £16 5s. per ton, at the mines, for white powdered, Cornish makes. The lead products are only in quiet demand, but prices are steady on the whole, with nitrate selling at from £34 10s. to £35 and brown and white acetate of lead at £39 10s. and £40 per ton, respectively. Relative scarcity continues to have a firming influence on the prices of acetate of lime, the brown quality being quoted at £17 10s. to £17 15s. per ton and the brown at about £9.

Acids and Tar Products

The demand for tartaric acid this week has been on moderate lines, with values, if anything, a shade easier at 1s. 4d. per lb. Citric acid also is less strong than it has been of late, and small prompt parcels have been on offer at from 2s. 2d. to 2s. 3d. per lb. Oxalic acid is on the slow side, but quotations keep up at about £1 12s. per cwt. Acetic acid is steady and meets with some inquiry at about £66 per ton for glacial material and £36 for the 80 per cent. commercial.

Pitch business has so far shown no sign of expansion, and current export prices are largely nominal at £1 15s. per ton, f.o.b. Creosote oil also is on the quiet side and 4¾d. per gallon, naked, is about the top price of this material to-day. Solvent naphtha is steady and in moderate request at round 1s. 2d. per gallon. Crystal carbolic is in quietly steady demand at 6¼d. per lb., f.o.b., with crude about unchanged at 1s. 10d. per gallon for 60's.

Sir E. A. Brotherton on Dyestuffs

More Research and Rationalisation

In a review of British chemical industry, in *The Yorkshire Post* annual trade supplement, Colonel Sir Edward A. Brotherton, Bart., refers to nitrogen fixation and the production of liquid fuels from coal as the two pre-eminent developments that promise to add to the wealth of the world.

The position with regard to dyestuffs (Sir Edward states) is not reassuring. The industry has now enjoyed a measure of protection for eight years, and the Dyestuffs Act has a further two years to run. Gradual pressure from consumers in recent years has so reduced the prices of dyestuffs that margins are disappearing, and, although a bigger volume of business has been done, it has been at considerably reduced profits. This condition of affairs is not confined to this country. America is having the same experience. The working arrangement between the leading manufacturers of Germany and France has put the continental interests into a very strong position for attacking the overseas markets. The future for the British dyestuffs industry is still obscure; but it seems fairly clear that the industry can survive only by more extensive research and more effective rationalisation.

It seems absurd, in face of the peril which may lie at the end of the two remaining years of protection, for dyestuffs makers of this country to be competing against each other for business in the same ranges of dyestuffs. The field is quite big enough to accommodate all the existing factories without undue competition; but the industry seems to need organising as a whole; and there appears to be room for far more research, particularly in the vat colours which are gradually replacing dyestuffs of the older classes. So far as one can see at present, a period of ten years will prove too short to enable the British dyestuffs makers successfully to hold the field against their continental competitors; and it may still be necessary, in the national interest, to protect this key industry.

Chemists' Soiree at Dalton's House

John Dalton's old home in George Street, Manchester, provided just the right atmosphere for the soirée of the chemical section of the Manchester Literary and Philosophical Society held recently. In the large room adjoining the laboratory where the famous chemist worked on his atomic theory, Mr. J. C. Grundy had arranged many specimens of textiles and leather work to illustrate the beautiful effects of spray dyeing, and the guests were deeply interested in the description of the methods employed. They were told that besides cotton, wool, silk, and leather, felt responds to the treatment admirably, and in proof several attractively shaded trilby hats were displayed. Mr. L. Smith traced the development of fabric decoration and screened many attractive examples of Indian, Egyptian, and Javanese work, appropriately concluding with a series of views which conveyed an excellent impression of the processes in a modern Lancashire printing works.

Graesser-Monsanto Developments

Some important developments have been taking place lately in the Graesser-Monsanto Chemical Works, Ltd. This firm, successors to a business founded by R. Graesser 61 years ago, recently opened new offices at King William Street House, Arthur Street, London, E.C.4. Owing to the constant addition of staff transferred from the company's works at Ruabon, N. Wales, it has now become necessary for even more spacious offices to be taken, on the fourth floor of the building. The firm manufactures chemicals of the Graesanto brand, including acetyl salicylic acid B.P., salicylic acid B.P., phenol, pure cresols (*o*, *m*, and *p*), cresylic acids, and various derived products; acrosyl (a disinfectant and antiseptic); vanillin, saccharin (the two latter of the "Monsanto" brand), etc.

Company News

DISTILLERS CO.—The directors, in addition to declaring an interim dividend on the preference shares, have declared an interim dividend for the current year on the ordinary shares of 1s. 6d. per share, which is equal to 7½ per cent., less tax, on the present paid-up ordinary share capital. A similar rate of interim has been maintained for three years past, followed on each occasion by a final of 7½ per cent.

KRUPPS, ESSEN.—It is announced that no dividend is being paid to shareholders out of the net profit of seven millions marks (£350,000) earned by the Krupp works at Essen last year, but as the capital, which still remains in the private possession of the Krupp family, amounts to one hundred million marks (£5,000,000) the net profit is not smaller than that earned in the case of other mining enterprises.

CHAMPION AND SLEE.—The report for the year ended September 30, 1928, states that the balance brought forward is £3,175, to which is added trading profit, including interest and transfer fees of £12,193 and appreciation of Government securities in value, £650, making £16,019. Directors', secretary's and auditor's fees absorb £1,855, and depreciation of buildings, plant, etc., £2,982, leaving £11,181. The Directors recommend a dividend on the ordinary shares at 6 per cent. for year, carrying forward £2,781.

BLOUNT AND CO.—The first report of Blount and Co., hosiery, etc., manufacturers (of which Dr. Stephen Miall is chairman) for the period from May 23, 1927, the date of incorporation, to June 30 last, states that the net profit amounted to £9,021. The fixed dividend on the £100,000 7½ per cent. participating preference capital absorbs £6,250, and the balance of £2,771 is to be applied towards writing off preliminary expenses, which at present stand in the balance-sheet at £19,766. No dividend, therefore, is proposed on the £50,000 of 1s. ordinary shares.

Beet Drying Plant at Taunton

SUGAR Beet and Crop Driers, Ltd., is proceeding immediately with the equipment of a drying station at Norton Fitzwarren, near Taunton, for the drying of 25,000 tons of beet during the 1929 season. The factory which has been taken over will be fitted up for the slicing and drying of beet and the storage of the dried cossettes. It will thus be the first separate drying station erected for use under the Oxford process, the present factory at Eynsham being equipped with both beet drying and sugar extraction plants. It is the present intention to restrict the Taunton station to the drying of beet during the 1929 season, and to send the dried cossettes to Eynsham, where the sugar extraction process will be carried out.

Should it be decided subsequently to add an extraction plant to the Taunton equipment, this will make it possible to establish a separate drying station in Cornwall, thus securing for the farmers in that county the full advantage of local delivery, with the consequent saving in transport charges.

Chemical Merchant's Affairs

IN the bankruptcy of Wilfrid Cecil Smith (described in the receiving order as Wilfred Smith), chemical merchant and agent, of 37, Great Tower Street, London, E.C., the Official Receiver has issued to the creditors a summary of the debtor's statement of affairs, and this discloses liabilities £14,699, of which £4,533 are expected to rank, and assets £5 odd, absorbed in part payment of a preferential claim. Book debts of the nominal value of £11,170 are expected to produce nil.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries :—

125. (*Sumazine Blue.*)—A firm in Holland wishes to obtain the address of the makers of Sumazine Blue, an aniline dye replacing Ultramarine Blue.

124. (*Siberian Pine Needle Oil.*)—The names of suppliers in this country of Siberian Pine Needle Oil are required.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C 2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks, and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to February 9, 1929.

TREFOIL.

490,869. Class 1. Chemical substances used in manufactures, and paints, enamels, lacquers, varnishes, and anti-corrosives, but not including carbonic acid gas, photographic chemicals, photographic plates or photographic films and not including any goods of a like kind to any of these excluded goods. Bakelite, Ltd., 68, Victoria Street, London, S.W.1 : manufacturers.—April 27, 1928. (To be Associated. Sect. 24.)

SURPRISE.

497,571. Class 1. Dyes. Wm. Edge and Sons, Ltd., 50, Raphael Street, Bolton, Lancashire; manufacturing chemists and dye merchants.—November 29, 1928. (To be Associated. Sect. 24.)

NORDURCUM.

497,639. Class 1. Paints, varnishes, enamels, colours, distempers, japans, lacquers, driers, wood preservations, wood stains, anti-corrosive and anti-fouling compositions, and anti-corrosive oils. James and Co., Ltd., Ouseburn Lead Works, Hebburn-on-Tyne, Co. Durham; manufacturers of lead, paints and colours. December 1, 1928.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

DISINFECTANTS.—The Egyptian Department of Public Health is calling for tenders, to be presented in Cairo by February 10, for the supply of disinfectants for medical and general purposes required during the year ending April 30, 1930. (Reference No. B.X. 5030.)

GUM COPAL, SHELLAC, TURPENTINE AND RESINS.—An agent in Cologne desires to secure the representation, on a commission basis, and for the district of Cologne, of British firms dealing in the above. (Ref. No. 30.)

WOOD NAPHTHA.—The Egyptian Customs Administration at Cairo is calling for tenders, to be presented in Alexandria by March 15, for the supply of 135,000 kilos. of wood naphtha (wood spirit). (Ref. B.X. 5,006.)

Einstein's Electro Chemical Process

AN issue of 250,000 8 per cent. participating preference shares of £1 each and of 250,000 ordinary shares of 4s. was made by Einstein's Electro Chemical Process, Ltd., on Thursday. The patented process of the company is described as a discovery whereby all kinds of materials of any shape or contour, both conductors and non-conductors of electricity, can be metallised by electro-chemical action to any desired thickness. Wood, metal, aluminium, duralumin, tile, brick, plaster, etc., can, it is claimed, be metallised for use in the building and allied trades. The materials are rendered damp-proof and fireproof with greatly added strength. Metal work can be rendered anti-corrosive, and wood mouldings can be treated with bronze, brass, etc., for use on shop front and decorative interior construction. Doors, window sashes, wainscotings, panel boards and panelling can be artistically metallised with one metal on another. Materials such as cardboard or plywood can be given increased strength and resistance to the corrosive action of steam, heat, chemical fumes and water. Linen, gauze, silk, leather, etc., can be delicately metallised, with handsome results. Many aeroplane and seaplane parts will, it is stated, be manufactured by this process, for great strength can be obtained and perfect resistance to water corrosion given. The cost of metallising goods by this process is extremely low.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

SQUIRE, Mr. J. W., 13, Boston Mews, Upper Gloucester Place, N.W., manufacturing chemist. (C.C., 19/1/29.) £26 15s. 11d. December 3, and £68 6s. 6d. December 6.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

CAVENDISH'S, LTD., London, E.C., manufacturing chemists. (M., 19/1/29.) Registered December 28, £1,000 charge, to R. S. Smallman, 8, Queen Street, E.C., solicitor; charged on 3, London Wall Avenue, E.C., etc. *Nil. May 15, 1928.

HOLDEN (ARTHUR) AND SONS, LTD., Birmingham, paint manufacturers. (M., 19/1/29.) Registered January 7, £2,000 debentures, part of £20,000; general charge. *£8,600. June 28, 1928.

MAISELS PETROLEUM TRUST, LTD., London, E.C. (M., 19/1/29.) Registered December 31, £1,639 16s. 1d. debenture, to J. B. Knight, administrator of Austrian property, Cornwall House, Waterloo; general charge. *£12,500. December 31, 1927.

MALEHURST BARYTES CO., LTD., near Shrewsbury. (M., 19/1/29.) Registered January 2, £5,000 debentures, part of £25,000; general charge. *£71,500. October 17, 1928.

MATTHEWS (STEPHEN) AND CO., LTD., London, E.C., manufacturing chemists. (M., 19/1/29.) Registered December 21, £1,500 debentures, to Travers Cleaver, Ltd., 38, Grosvenor Place, S.W.; general charge. *£1,900. August 22, 1928.

MATTHEWS & WILSON, LTD., London, S.E., manufacturing chemists. Registered January 1, £100 debentures part of £2,000; general charge. *Nil. December 31, 1927.

VICTORIA OIL AND REFINING, CO., LTD., Strood. (M., 19/1/29.) Registered December 20, £10,000 mortgage and a debenture collateral thereto, to Guardian Assurance Co., Ltd., 68, King William Street, E.C.; charged on property at Frindsbury, and general charge. *£7,000. December 29, 1927.

Satisfactions

PLYMOUTH OXYGEN CO., LTD. (M.S., 19/1/29.) Satisfaction registered January 2, £5,000, registered May 19, 1926.

TAYLOR AND NICHOLSON, LTD., Walmersley, bleachers. (M.S., 19/1/29.) Satisfaction registered December 29, £15,000, registered June 18, 1908.

London Gazette, &c.

Winding Up Petition

CHEMICAL ENGINEERING CO. (MANCHESTER) LTD. (W.U.P., 19/1/29.) A petition for winding-up has been presented by J. W. Battersby, 124A, Beulah Hill, Upper Norwood, London, S.E.19, company director, and is to be heard at the Court House, Quay Street, Manchester, on Monday, February 4, at 10.15 a.m.

Receivership

BROADWAY PHARMACY, LTD. (R., 19/1/29.) H. W. Carter, of 78, Lavington Road, West Ealing, was appointed receiver and manager on January 1, 1929, under powers contained in debenture dated August 13, 1928.

New Companies Registered

BRITISH CHEMICALS AND PHOTOGRAPHIC SUPPLIES, LTD.—Private company. Registered January 10. Nom. capital, £100 in 1s. shares. Manufacturing chemists, analysts and research chemists, manufacturers, agents, importers and exporters of and dealers in chemical and photographic goods, dealers in and smelters of all classes of photographic and jewellers' sweep, etc. A subscriber: R. H. Spinneys, 97, Stockwell Park Road, S.W.9.

BRITISH INDUSTRIAL SOLVENTS, LTD.—Registered as a "private" company on January 9. Nom. capital £500,000 in 300,000 8 per cent. cumulative preference (with priority as to capital) and 200,000 ordinary shares of £1 each. To adopt agreements (1) with the Methylating Co., Ltd., (2) with the Distillers Co., Ltd., and (3) with Holzverkohlungs-Industrie A.-G., and to carry on the business of manufacturers of acetic acid, acetone, butyl alcohol, esters and all other forms of chemicals and chemical products, etc. Directors: Dr. Adalbert Fischer, Dr. Koloman Roka, W. R. Ormandy, W. H. Ross (chairman), H. Green, A. Campbell, T. H. Board.

HYDRA-OXYGEN SMOKELESS COMBUSTION CORPORATION, LTD.—Registered January 11. Nom. capital £7,000 in £1 shares. To acquire any inventions relating to smoke abatement and the softening and purification of water and of any apparatus therefor, in particular to acquire from G. W. Conduit the benefit of certain existing inventions in relation thereto, and to carry on the business of manufacturers of and dealers in apparatus and things in connection with the above, and that of engineers, etc. Directors: F. Henry May, T. B. Ede, J. Gow-Robertson and G. W. Conduit. Solicitors: Kenneth Brown, Baker, Baker, Lennox House, Norfolk Street, London, W.C.2.

SEA PRODUCTS, LTD.—Registered as a "public" company on January 10. Nom. capital £80,000 in 69,000 10 per cent. cumulative preferred ordinary shares of £1 each and 220,000 deferred shares of 1s. each. To engage in the fishing and whaling industry in all parts of the world; to produce, manufacture, distil, refine and deal in oils, tallow, grease, hides, offal and all classes of oleaginous and saponaceous materials, etc. Directors: G. E. Thompson, 7, De Vere Gardens, Kensington, London, W.8, J. D. Ogilvie, H. Burrows, W. O. Larmuth, A. E. Starkey.

VANDEGRIFT COAL DISTILLATION, LTD.—Registered as a "private" company on January 15. Nominal capital, £100,000 in £1 shares. Distillers, extractors, producers, manufacturers and suppliers of solid, liquid and gaseous substances or material derived from coal or any other carbonaceous or other substances, manufacturers of and dealers in fuels for domestic, industrial and other purposes, tar, sulphate and other forms of ammonia, oils, chemicals and products and residuals of coal, slack, peat or refuse, engineers, founders, ironmasters, etc. A subscriber: H. J. Fellows, 56, Rathcoole Gardens, Hornsey, London, N.8.

The Nickel Merger

THE Mond Nickel Co., in the course of a circular sent to remind shareholders who had not yet accepted the offer from the International Nickel Co. of Canada that the provisional agreement called for acceptance of the offer by Friday, drew attention to the following paragraph in the offer: "Apart from other anticipated benefits, there must inevitably be a wider market for the stock in the Canadian company than exists at present for the shares of your company. On the other hand, the market in the shares which are not exchanged must tend to become restricted, and this feature is one of importance to trustees and others who may in the future desire to dispose of their holdings in your company."